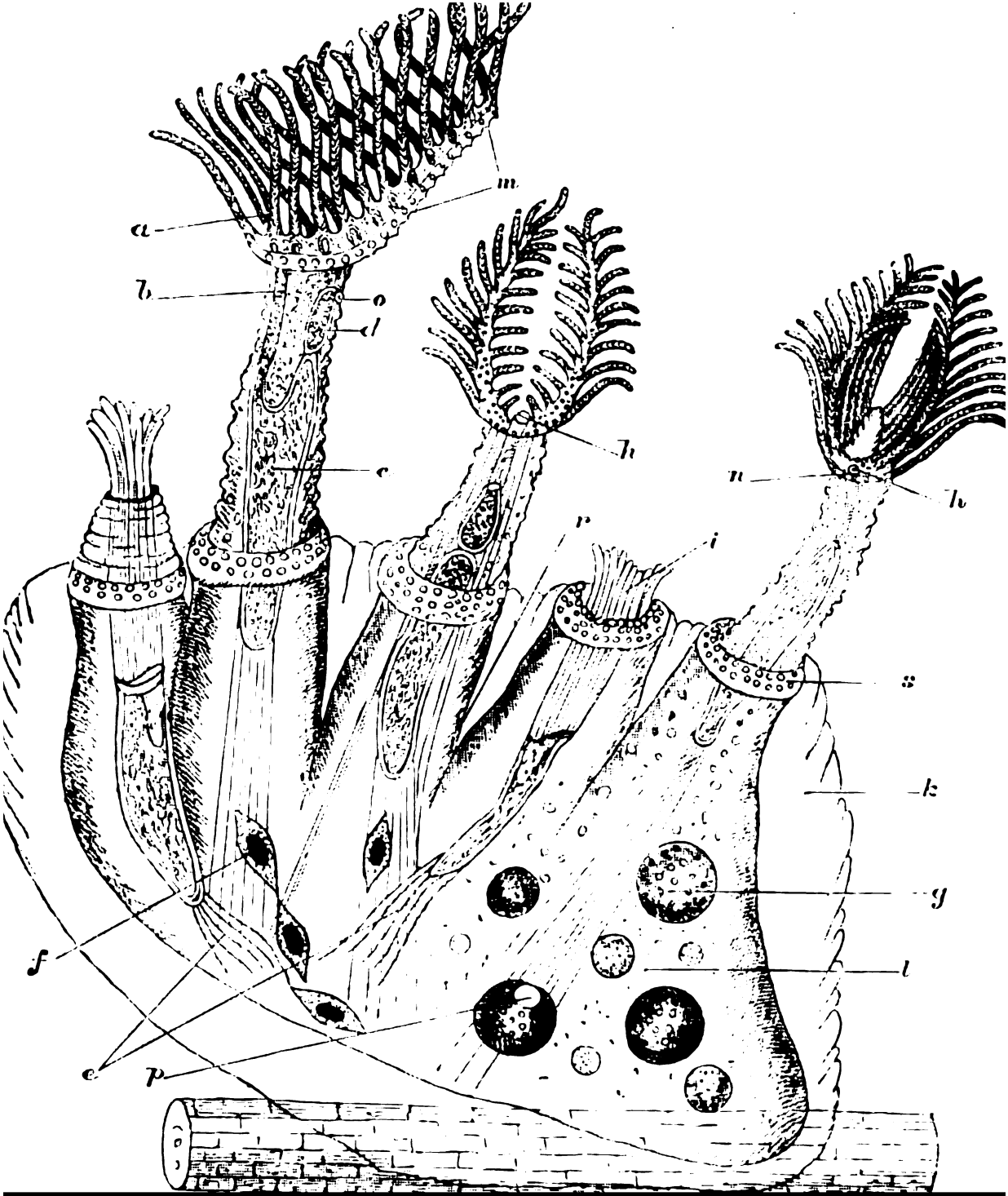

Hardwicke's Science-gossip

HARDWICKE'S

SCIENCE-GOSSIP

FOR 1874.

HARDWICKE'S

Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

EDITED BY J. E. TAYLOR, F.L.S., F.G.S., &c.,

AUTHOR OF "GEOLOGY OF MANCHESTER AND THE NEIGHBOURHOOD," "SKETCH OF THE GEOLOGY OF SUFFOLK," "GEOLOGICAL STORIES," "HALF-HOURS AT THE SEASIDE," "HALF-HOURS IN THE GREEN LANES," ETC.

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PREFACE.

CUSTOM has rendered it an imperative rule that every volume shall have a "Preface." A magazine must submit to the same ordeal as its more pretentious brethren, whenever it collects its twelve scattered numbers into one. But the practice gives the Editor this advantage—once in a year he can address his readers and contributors *ex cathedrâ!* He can cry *peccavi* to the complaints that may be raised, or smile with satisfaction at the compliments proffered. He can give friendly hints to those to whom they may be useful, and not less effective reproofs where these may be needed. He can draw the bond of union which unites people of all ages and in every position in life, but possessing kindred tastes, more closely together; and feel that he is addressing them, not as "readers" and "contributors" only, but as "friends."

One feature in the past year's numbers our readers may have noticed — we have endeavoured to give, under their respective headings, abstracts of the most important papers read before scientific societies. This is of great importance, as enabling those who love natural history, but have little means or leisure to go deeply into it, to obtain an intelligent knowledge of what is going on in the great world of Science.

Our "Correspondents" column is that which always lays us under obligation to our scientific brethren, whose willingness to help is best known to those who test it most. For ourselves, as well as for our querists, we return them our sincere thanks for the kindnesses shown during the past year. Whilst we are referring to this subject, it might be as well to suggest that nearly one-half of our questioners

would save us much trouble, and inform themselves much better, if they endeavoured first to obtain the information themselves. In many cases, the simplest manual of natural history, such as few cottage shelves are now without, would amply supply the knowledge sought for. Nor is a hint here out of place as to the manner in which the objects sent for identification are packed. *Match-boxes* seem to be the favourite vehicles of transit, and we should like nothing better than that those who adopt these otherwise useful packing-cases, should see the postal litter in which they are frequently delivered!

Natural Science is extending its borders, and increasing in the range and boldness of its speculations. Only a few, however, are privileged to stand on its mountain peaks, and view the land that is afar off! But it is surely not too ambitious a hope to entertain that the facts collected and recorded in such magazines as SCIENCE-GOSSIP afford some additional data out of which the great scientific superstructure is being built.

With kindly feelings of gratitude and friendship we dedicate this volume to our readers, and wish them individually

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SKETCH OF THE GEOLOGY OF BELFAST AND THE NEIGHBOURHOOD.

By W. H. BAILY, F.L.S., F.G.S., &c.
Palæontologist to the Irish Geological Survey.

BELFAST is situated on the Upper New Red Sandstone, "Bunter," and is covered by alluvium on the eastern side, being bounded by the river Legan; a higher division of the Triassic, or New Red Sandstone formation, consisting of red marls and sandstone, "Keuper," also extends across the country, having the cretaceous rocks as its boundary in a south-westerly direction.

One of the nearest geological places of interest in the neighbourhood of Belfast is that of Cave Hill, in the county Antrim, about two miles from the extreme northern end of the town. This hill, with other basaltic eminences west and south-west of Belfast, such as the Black Mountain, 1,272 feet in height, Black Hill, 1,884, and White Mountain, 820 feet high, present very prominent features in the landscape; their eastern slopes are rugged and precipitous towards the north, but more gradual and easier of ascent to the southward.

The basaltic plateau of the north-east of Ireland, of which this district forms a part, has been described by the late General Portlock in his Geological Report on Londonderry, Tyrone, &c.; its thickness on these hills ranges from 424 to 817 feet. Alternations of mineral character have been observed in these volcanic rocks, which indicate successive flows, with intervening periods of repose.

These hills form the escarpment of the Chalk and Greensand; sections of these sedimentary strata (which are sometimes penetrated by the basalt in the form of dykes), as well as of the Lower Lias, or Rhætic beds, are well exposed at Cave Hill. The quarries in the Upper Chalk "White Limestone" are extensive; the stone being largely used for lime, is conveyed by special tramway to Belfast.

At Collin Glen, in the same county, five miles south-west of Belfast, a deep ravine cut by the Collin river exposes similar strata, the upper cretaceous rocks resting immediately upon the dark grey or bluish shales of the Lower Lias, or Rhætic beds, under which are the marls of the Keuper division of the New Red Sandstone. The section at this place has been described by Mr. Ralph Tate, F.G.S. (*Quart. Journ. Geol. Soc.*, vol. xx. p. 103), and also by the Geological Surveyors in the Explanation to Map 36, "Geological Survey of Ireland."

The strata being displaced by several faults, the section exhibited is a very instructive one, with an abundance of fossils in some of the beds.

The oldest rocks are the Keuper marls, the uppermost division of the New Red Sandstone, upon which the Rhætic beds have been deposited, consisting of shales and thin bands of limestone, some of them full of characteristic fossil shells, such as *Avicula contorta*, *Cardium Rhæticum*, &c.

On these rest what Mr. Tate designates as the "Hibernian Sandstone," which he groups into three zones, the lowest, or "Glauconitic Sands," containing *Exogyra conica* in profusion, a shell belonging to the Ostreoid group; the middle division consists of "yellow sands and marls," with shells, &c., amongst which *Pecten quinquecostatus* is the most prevalent; and the upper, upon which the Chalk rests, is "Chloritic Sandstone," locally termed "Mullatto;" in the beds of this division another species of Ostreoid shell, *Exogyra columba*, is plentiful, with numerous remains of sponges, resembling Siphonia of the Warminster Greensand.

At Woodburn Glen, two miles north-west of Carrickfergus, similar strata are to be seen, cut through by the Woodburn river.

harm, used to be a custom with some of the inhabitants of the Chinese seas. Old Fuller referring to this plant says, "Some avow it soveraigne for men and beasts in most maladies, though the scent thereof be somewhat valiant and offensive"; and Sir William Temple in his "Treatis on Health and Long Life," says, "Garlic has, of all plants, the greatest strength, affords most nourishment, and supplies most spirits to those who eat little flesh"; he also states that it is a specific remedy in gout. It was greatly commended by old writers as a cure for ague; and is still in Kent, and probably in other counties, placed in the stocking of the child afflicted with the whooping-cough, in order to allay this malady. (See Pratt's "Flowering Plants," &c.)

There are several varieties of garlic natives of our country. The Crow Garlic (*A. vineale*), not unfrequently found throughout England and the south of Scotland, also near Dublin; its leaves are sometimes used as a salad. The Broad-leaf Garlic or Ramson (*A. ursinum*). Moist shady groves and thickets are its favourite habitation, and the copious snow-white flowers, enlivening many a shady dell, might be seen with pleasure, if the odour of the herb, whenever it is bruised or trodden upon, did not so frequently infect the air around. In olden times this plant was considered by our ancestors highly beneficial to health, as we learn from one of our oldest proverbs which reads thus in modern English:—

"Eat Leeks in March and Ramsons in May,
All the year after physicians may play."

Ray considers the island of Ramsay to have taken its name from the quantity of the broad-leaf garlic or Ramson which grows there. In Kamtschatka this plant is much prized by the inhabitants, both as a medicine and as an auxiliary article for food. The Russians, as well as the natives, gather it in large quantities for winter use. After being steeped in water, it is mixed with cabbage, onions, and other ingredients, the whole forming a ragoût, which is eaten cold. This plant is there considered as almost a specific against the scurvy, no sooner lifting its head above the snow than the dreadful disease loses all its horrors; at even the worst stages a cure is produced by the plentiful use of the wild garlic. According to Skinner, the word garlic is derived from the A.-S. *Gar*, as applied to a lance, and as *Lear*, a leek,—from the leaves rising like lances or javelins.

Shalot or Eschalot (*A. ascalonicum*) is a relative of the Onion, and was formerly called Scalion, from Ascalon, a town in Syria, near the Mediterranean, from whence the Greeks first procured them. Pliny says the Ascalonian onions are proper for sauce. The time of its introduction into this country is not known; some writers think we owe it to the crusaders. Turner mentions it as a well-known plant in his "Signes of Herbs," published in 1548. This plant resembles the true garlic in having its roots divided into cloves or smaller bulbs, inclosed in a thin membrane. Each of these small bulbs sends forth two or three fistular awl-shaped leaves, issuing from a sheath; they are nearly similar but not so large as those of the Onion. The Shalot does not in all situations produce perfect seeds or even flowers, therefore some old authors denominated it the barren onion from this circumstance. The want of seed is, however, fully compensated by the multiplication of the bulbs. The flavour is much more pungent than that of the Garlic, but not so rank.

The Chive (*Allium Schœnoprasum*) is the smallest though one of the finest-flavoured of the genus. It is a hardy perennial plant, an inhabitant of Northern Europe and Russian Asia, said to be a native of Britain, though rarely found growing in a wild state. The leaves, which resemble small rushes, are used for salads, &c., and in some cottage gardens it is planted as an edging to the flower-beds.

The Leek (*A. Porrum*) is a branch of the Onion family, and is said to be indigenous to Switzerland; but it has been for so many years under cultivation that its native place cannot, perhaps, be very accurately traced. Pliny states that the best leeks were brought from Egypt and the next to them from Orthe, now called Guzelhizar, a town about 15 miles from Ephesus. This great naturalist relates that this vegetable was brought into notice and esteem through the Emperor Nero, who used to eat them for several days in every month to clear his voice. He took them with oil only, debarring himself even from bread on these days.

The exact period when the Leek was introduced into this country is not known. "Hortus Britannicus" states that it was about 1562; but they must have been in cultivation much earlier, as they appear to have been used by the Welsh as far back as we can trace their history. Tusser sings their praises in verse, and says they were in common use in farm-houses long before his time. Gerard, who wrote soon after, mentions leeks in such a manner as to induce us to think them indigenous to our soil; he says, "Leeks are very common everywhere in other countries, as well as in England." The hardiness and pungency of the Leek both tend to recommend it in those countries where few potherbs are grown, and it seems to have great facility in adapting itself to climate. The Leek which is cultivated in the colder parts of Scotland, and thence is called the Scotch leek, is more hardy and also more pungent than the broad-leaved variety, chiefly cultivated in England. It was formerly a very favourite ingredient in the "cock-a-leekie" of the Scotch, which is so graphically described in "The Fortunes of Nigel" and of which James the First is reported to have been so fond that he retained his preference for it notwithstanding all the dainties of London cookery.

Coles, in his "Adam in Eden; or, Paradise of Plants," a curious old work published in 1657, says, concerning leeks:—"The gentlemen in Wales have them in great regard both for their feeding and to wear in their hats on St. David's day."

Worledge, writing in 1668, gives a good idea of the love of the Welsh for these kinds of odoriferous vegetables. "I have seen," says he, "the greater part of a garden there stored with leeks, and part of the remainder with onions and garlic."

The origin of the Leek as an emblem of Wales, and being worn on St. David's day, has given rise to much controversy at various periods. A writer in the *Gentleman's Magazine* for February, 1735, states that on the 1st March, 640, the Welsh, under the command of King Cadwallo, gained a great victory over the Saxons, and had at the same time put leeks in their hats to distinguish themselves, fighting near a field which was replenished with this vegetable, which has ever since been esteemed as a badge of honour among them.

Townsend gives the same account in his "Manual of Dates," but places the event a hundred years earlier. Shakespeare alludes to the custom of wearing the Leek by the Welsh in the fourth act of his "Henry V." A contributor to a periodical work (the *Gazette of Fashion*, 1822) thinks it more probable that leeks were a Druidic symbol employed in honour of the British Ceudven or Ceres. In which hypothesis he thinks there is nothing strained or far-fetched, presuming that the Druids were a branch of the Phœnician priesthood. Both were addicted to oak-worship, and during the funeral rites of Adonis at Byblos, leeks and onions were exhibited in "pots with other vegetables," and called the gardens of that deity. In Egypt leeks and onions were also deposited in the sacred chests of the mysteries both of Isis and Ceres. This vegetable is represented among the Egyptian hieroglyphics; sometimes a leek is on the head of Osiris, and at other times grasped in an extended hand.

Porrus, a leek, is derived by Bryant from the Egyptian god Pi-orus, who is the same as the Baal Peor of the Phœnicians, and the Bel or Bellinis of the Druids. Théis gives another derivation to the word, and says it is from *pori*, to eat, in Celtic; whence comes our word porridge, in which leeks formerly constituted an ingredient.

It is stated in Hooker and Arnott's "British Flora," seventh edition, that *A. Porrum*, the garden leek, is nowhere found truly wild. Bentham says, in his Handbook, it is believed to be a cultivated variety of *A. Ampeloprasum*, which is found in two or three spots in Western England, but supposed to have been introduced, or the remains of ancient cultivation. Most of the Onion tribe have sulphur in their composition, as well as free phosphoric acid.

The bulb of the Onion is in reality not a root any more than the Potato, but an underground bud, containing all the parts hereafter to be developed. The Potato is an underground stem, or rhizome, covered with buds or eyes, from which new plants are produced. I will now conclude my paper on these odoriferous and pungent vegetables with some lines from a Harl. MS. in the British Museum, written no doubt by a Welshman:—

"I like the leek above all herbs and flowers,
When first we wore the same the field was ours.
The leek is white and green, whereby is meant
That Britons are both stout and eminent.
Next to the lion and the unicorn,
The leek 's the fairest emblem that is worn."

HAMPDEN G. GLASSPOOLE.

ON APHIDES.

IT is difficult for the rose-cultivator to look with any degree of interest at the swarm of green plant-lice which sometimes infest his choicest specimens, or for the farmer to contemplate placidly the black pests which are destroying his bean crop; but the life-history of these creatures is so curious, and so replete with interest, that the mere naturalist may be excused if he sees in them something to admire. I have no doubt more than one species of aphis is more than sufficiently well known in appearance to all my readers, but I doubt if we have all taken our revenge so fully as we might have done, by making them reveal the secrets of their wonderful economy to us in return for the damage they have done to our floral pets.

The Aphis, or plant-louse, belongs to the order Homoptera, and the genus is a very large one, numbering, I believe, some three hundred and twenty species, almost every one of which requires its own peculiar plant to supply it with nourishment. The species with which we are most familiar are those found in the rose, bean, hop, and fruit-trees. The damage done by the hop-fly, as it is called, is sometimes very great, affecting the duty to the extent of many thousands of pounds. Other species cover the stems of plants, or infest the under surface of the leaves, causing them to form hollow cavities of a red colour, in which they find a perfect shelter. Their mode of feeding is to draw up the sap through the rostrum, and thus, by diminishing the vigour of the plant, they produce deformity and injury to the fruit or flowers. It is said that they do not attack plants in perfect health, and this I believe to be the case generally, but whether it always holds good I cannot say; certain it is that any circumstance (drought, easterly winds, &c.) which checks the vigour of the plant is favourable to the attacks of the aphis. I have also noticed that an improvement in the health of the plant is attended by a corresponding decrease

in the aphides, and that they will again multiply should the plant exhibit fresh signs of sickliness. The suddenness with which they make their appearance, and the vast numbers acquired in a very brief period, are wonderful: the plants in a whole field of beans will appear to be covered in a few days; but this will be less astonishing when we consider the mode of reproduction and the rapidity with which it takes place. Sexual intercourse takes place only in the autumn, after the insects have become fully developed; the female then deposits her eggs in some secure spot, where they remain

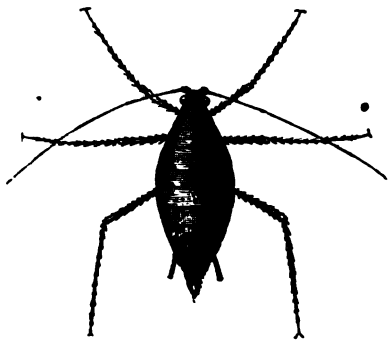

Fig. 92. Wingless Aphis (magnified).

dormant through the winter, the first genial days in spring bringing forth not the perfect-winged form which produced the egg, but the well-known wingless form which is so familiar to us all. This wonderful fertile larval form is possessed of great fecundity, but it is its mode of reproducing which is so remarkable: this is carried on by internal gemmation, the young one being produced alive, and differing from its parent only in size. This process of development goes on for several generations without any change in the form of the insect; at the close of the summer, however, the fertile forms which have not reproduced themselves pass, by metamorphosis, into the perfect insect, males and females, for the most part winged. These, after pairing, produce the eggs which are to be hatched in the ensuing spring, after which they die. During the summer numbers complete their metamorphosis, and appear as winged insects. The larval form which will undergo the final metamorphosis may easily be recognized, the bulbs in which the wings are inclosed being visible on either side the thorax. I have separated many of these, and placed them under a glass shade, but in no instance have they reproduced, the development continuing until, after the final shedding of the skin, they have appeared as fully-developed winged insects. These have never produced eggs, and I think were all males; it seems probable that although winged insects are produced during the summer, it is not till the autumn that the perfect females are produced; all the fertile larval females which I have kept, either alone or under the same shade with the winged form just mentioned, having increased rapidly in the usual way, and in no instance produced eggs. The perfect insect is very different from the larval form, and under the magnifying-glass a very handsome object, with six long legs, graceful antennæ, shining wings and spotted sides, also a pair of curious projecting tubes, standing out like horns, near the extremity of the abdomen, of which more hereafter. This intermediate but fertile form of the aphis is an example of the nursing system of Steenstrup, observed also in the vegetable kingdom in the case of the ferns and horse-tails, which increase by spores, which, falling into the ground, produce the *prothallium*. The prothallium never becomes a fern, but on it are formed the true generative organs which produce the embryo afterwards developed into the perfect plant. This case differs from the aphis in the nurse-form (the prothallium) producing the generative organs.

Fig. 93. Winged Aphis (magnified).

The echinoderms, &c., exemplify other variations of the same phenomena. Mungo Ponton thus describes the fertile nurse-form and the way in which it is illustrated by the aphis:—"By fertile nurse-form is to be understood an organism which becomes fertile without ever attaining, or at least before having attained, the perfect form due to its species. . . . In simple metamorphosis, it is one and the same individual organism that passes through all the stages, from the form which it wears on leaving the egg, to that which it assumes on attaining the perfection belonging to its species; but in the case of a fertile nurse-form, it is in general only those forms which are produced by the nurse that ever attain the specific type. So likewise, in simple

concurrent reproduction, it is one and the same organism that exerts both the power of individual multiplication and the faculty of sexual generation; whereas in the case of fertile nurse-forms, it is seldom they possess both; but if the nurse be endowed with the one, its offspring will be endowed with the other." ("The Beginning: its When and its How," pp. 242–3.) It sometimes occurs that the nurse acquires the power of sexual generation, also that the species passes through more than one nurse-form, either similar or diverse, before attaining the perfect form of the species. In the aphis is found one of the most decided examples of the fertile nurse-form (and one which it is very easy to study), the immature females standing in that relation to the perfect insect.

These fertile females, as has been said before, reproduce by internal gemmation, the bud falling into a proper receptacle in the parent's body, and being produced alive, exactly like its parent, except in size; each female producing from 50 to 100 young ones. So rapidly do they increase, that it has been calculated that from one individual there might be descended, under favourable circumstances, the enormous number of 4,000 billions in a single summer.

Were it not for its many enemies, the increase of the aphides would be beyond all bounds; but fortunately for us its enemies are very numerous. Birds consume great numbers, but the larvæ of the Ladybird, feeding exclusively on the aphides, destroys them wholesale, extracting all the soft parts, and leaving the empty skins to testify to their enormous appetites. The larva of the beautiful lace-winged fly destroys great numbers, as does also that of the various species of Syrphidæ. In July, 1869, we were visited by a great plague of aphides, and all the three species I have named speedily made their appearance also in great numbers. The ladybirds swarmed in countless numbers, and immense numbers of their unsightly larvæ soon appeared. The rapidity with which these larvæ cleared the aphides from a hop-plant in my garden was truly astonishing. The clusters of curious pedunculated eggs produced by the Lace-wing fly were numerous, as were the perfect insects, than which nothing can be imagined more delicate and beautiful or a greater contrast to its larva, which from its voracity has been named the aphis-lion.

Another foe is a small species of Ichneumon which deposits its eggs in the body of the aphis, the larvæ feeding upon its soft parts. The brown and swollen skins of the insects thus infested may frequently be seen, and if placed by themselves in a glass-topped box, the active little ichneumons will soon burst through their prison and reveal the secret of the death of the unfortunate aphides.

There is another curious chapter in the history of the aphis which is worthy of notice. It is the unfair treatment which it receives at the hands (or antennæ) of the ants. Linnæus calls the aphis the ant's "cow," and the use to which this sagacious little insect subjects it fully justifies the term. The aphides eject from the two tubes before mentioned as situated one on either side of the abdomen, a quantity of saccharine fluid, which is very attractive to the ants, and forms in some cases almost their only food. This fluid may be noticed overspreading the leaves of plants infested by these insects till they have a glazed appearance, and seem to have been washed with honey and water. It is commonly called "honey-dew," and was long a puzzle as to its origin. Not only do the ants consume the fluid voluntarily ejected by the aphides, but by a peculiar movement of their antennæ upon the bodies of their "cows," excite them to an increased supply. This has not inaptly been called "milking." But even this is not all. Kirby and Spence give a most wonderful account of the way in which some species of ants, particularly the yellow ant (*F. flava*), convey the aphides to their nests, and keep them there for the supply of their necessities. The yellow ant makes prisoners of a root-feeding species of aphis (*A. radicum*), and even carries off its eggs, which are tended with care and placed in situations favourable for their early development.

I think it will be allowed that whether we consider the aphis as a marked example of the wonderful "nurse-form," as described by Steenstrup in his "Alternation of Generations," and one accessible for study to us all; or whether we confine our attention to its life-history and the singular connection between it and the ant, to which it is so serviceable, there is ample scope for observation, and that too of a character, from the delicacy and exactness required in its pursuit, which must of necessity be good training, should it even only extend to verifying the observations of others on this interesting but generally unwelcome little creature.

HISTORY OF THE DIATOMACEÆ.

(*Concluded.*)

PROFESSOR H. L. SMITH has published his second instalment of his translation of the "Historical Preface of Kützing." This is for the most part a record of Kützing's own labours. In his "Synopsis Diatomearum" he separates the true Diatomaceæ, with hard and glassy shells (valves), from the softer-shelled forms, which he called Desmidieæ. This seems to have caused some complaints, of a desire on the part of the author to unduly multiply species; but he remarks that "not only all the species established by myself stood proof, but even many a form mentioned by me as a variety, was established by others as distinct species."

Ehrenberg took the trouble, in his third "Aid to the Knowledge of Larger Organisms in the direction of the smallest space," * to reduce most of the forms established by me in the Synopsis to such forms as were known to him; but later he has established the same forms as distinct species, in his larger work on the "Infusoria." (Ehrenberg did not publish his great work on the diatoms, "The Microgeologie," until some few years after Kützing had given his "Bacillarien" to the world. This work is a monument of patient but misdirected labour. The figures occupy 39 folio plates, and are far better than any previously published. The plan he adopted was to give a representation of all the forms that appeared in the field of the microscope, under a power of about 100 diameters. Grouped around the circle containing these forms were separate drawings of them, enlarged to about 300 diameters. This arrangement, although useful in some respects, was open to many objections, not the least of which was the necessarily heavy cost and large bulk of the book, for, not content with giving a large and small representation of an object, it was repeated again and again if it occurred in different deposits.—F. K.)

Kützing explains that the inferiority of his figures was owing to the indifferent microscope he used, and goes on to say that, however insufficient his instrument, he made by it his most excellent discovery, viz., the siliceous nature of the Diatomaceæ, which soon led, through his friend Henri Fischer, of Pirkenhammer, near Carlsbad, to the other important discovery of the fossil deposit of these organisms. "I had already, in my Synopsis, called the substance of which these shells were composed 'glassy,' because I had even then suspected siliceous earth in these frustules. I communicated these to my friend Bilz, an expert equally renowned as botanist and chemist, at the same time asking him whether he would investigate chemically specimens which I would send to him. Bilz, however, declined the commission, stating that he had no practice in the chemical investigation of microscopic objects." The matter rested for a short time, until recalled to the author's mind while investigating some Characeæ. "I placed some charæ in dilute muriatic acid, in order to remove the lime crust that was in the way of microscopic investigation. In the course of examination I found that the soft chara stems were on the outside garnished all over with diatoms, which were not at all affected by acids. Notwithstanding the twilight that had already commenced, I treated these diatoms in separate watch-glasses with concentrated acids, applying muriatic, nitro-phosphoric, and fuming sulphuric acids. The colour of the internal parts became, under the first influence of the acids, beautifully green; but further investigations with the microscope had to be postponed until the following day. After a sleepless night, the examinations were continued at the break of day, and at eight o'clock on the morning of May 8th, 1834, I had not only the full certainty of the siliceous character, but also of the iron contents of the diatoms. The diatoms which had been brought into contact with the concentrated acid had not changed otherwise than that their internal matter had disappeared."

The author afterwards tried the action of soda and a blow-pipe flame on a small mass of diatoms. The solution of these in the soda followed completely, and he obtained a perfectly transparent glass, which, on cooling, appeared of a vitriol-green colour, indicating the presence of oxide of iron. The interest of the preface may be said to conclude here; the remainder of it is taken up with acknowledgments of the kindness of various gentlemen who forwarded to him material from their own herbaria, and a complaint that Ehrenberg did not acknowledge, excepting very briefly and unsatisfactorily, his discoveries of the siliceous nature of the diatomaceous frustule, and the presence of iron in them. Kützing says—"I was somewhat astonished to see in Ehrenberg's large work on Infusoria the iron of the Gallionellæ mentioned as his discovery, while he does not even allude to the fact that I, in my essay sent to the Berlin Academy, mentioned iron as a general constituent of diatoms. It is easy to believe here in a 'turpinate.'"

(Perhaps some of the readers of SCIENCE-GOSSIP may be able to explain this expression; I am unable to do so myself.) F. K.

* This title is somewhat obscure. The original is "Zur Erkenntniss grosser Organisation in der Richtung des kleinsten Raums." I understand it to mean an aid to the knowledge of that large number of organisms occupying the smallest space.—F. K.

A HALF-DAY'S PLANT-HUNTING.

MY friend, Dr. M., having snatched half a day from his arduous professional duties, we drove off from home at 1·30 P.M., with the intention of visiting the great chalk ridge at Boxley, and afterwards the village of Boxley at its foot, through which meanders a small clear stream of water, which issues from beneath the chalk escarpment.

In our journey through the woods we made numerous halts in order better to examine the nature of the flora. The woods in this district are grown for the sake of hop-poles, &c., and are cut down periodically at intervals of from seven to ten years. In the clearings thus produced the botanist finds at all times a rich reward for the trouble expended in hunting through them. The summer after they are felled a great and varied selection of

plants makes its appearance, including many rare and curious orchids, the Herb Paris, &c. &c.

The trees themselves, of which these low woods are composed, are well worthy of note. Among a great many others we noted *Pyrus Aria, P. torminalis, P. Malus, Prunus communis, P. Cerasus, Viburnum Lantana, V. Opulus, Carpinus Betulus, Castanea vulgaris, Euonymus Europæus, Rhamnus catharticus*, &c. Beneath these trees we found immense beds of woodruff, and pretty little masses of the beautiful *Oxalis acetosella*. *Poterium sanguisorba* is everywhere very abundant on the chalk. By the way, self-fertilization is somewhat carefully provided against in these plants. The flowers are in dense heads, the upper flowers being pistilliferous and the lower staminiferous. The stigmas of the upper florets are in a receptive condition a considerable time before the staminiferous florets open—indeed, when these latter open, the stigmas are withered and dried away. Thus it is rendered impossible for the florets on any given head to fertilize each other. The pollen must be brought from some other plant, or at all events from some other flower-head.

Arrived at Boxley Hill we wandered about in search of specimens, and were soon richly rewarded for our trouble. Some years ago I found *Atropa Belladonna* growing on the wooded hill-side, and in the hunt to find it again, which proved unsuccessful, we met with the beautiful Fly orchis (*Ophrys muscifera*), the unique beauty of which cannot be understood from any description; it must be seen to be appreciated. Many non-botanical friends to whom it was shown were highly delighted, and bore testimony to the correctness of its name by suddenly exclaiming, "How like a fly!" "It might be used as a bait for fly-fishing," &c. &c. Near the same place we found the lovely *Cephalanthera grandiflora*, the curious *Aceras anthropophora*, some fine specimens of *Orchis maculata* and *O. pyramidalis*. My friend at this point began turning over large stones in an old chalk-pit, and we were greatly astonished to find beneath almost every stone a fine specimen of Blind-worm or Slow-worm (*Anguis fragilis*). The names of this lacertian appeared to us to be sad misnomers, for the creatures are very active when aroused, and far from being blind, they possess a pair of very sharp and extremely pretty eyes. We caught three, which were liberated after a careful examination.

In this pit we found the pretty *Helleborus fœtidus*, a great number of orchids, and a splendid plant of *Rosa rubiginosa*, which occurs in great abundance in this neighbourhood, &c. &c.

Among the plants here adorning the greensward were *Hippocrepis comosa, Anthyllus vulneraria, Lotus corniculatus, Helianthemum vulgare*, and *Polygale vulgare;* and Columbine (*Aquilegia vulgare*) was very abundant in the thickets. We met with several specimens of a white variety of Herb Robert (not common, I think).

Tea was consumed in a lovely quiet lane near the wood. We preferred roughing it thus to driving into Maidstone. Here all our senses were gratified at one and the same time. The scenery is delightful, and, owing to the rugged nature of the ground, much land is incapable of cultivation, and many miles of hills are covered with plants and trees of great variety, growing in rich luxuriance. Hundreds of yew-trees stud the hill-sides, their dark sombre foliage contrasting finely with the intermingled richer greens of other trees. The barer spots are everywhere thickly dotted with juniper-bushes, which grow here in great abundance. About a hundred feet above us towered a white cliff of chalk, in which numerous jackdaws and starlings had built their nests, and with clamorous cries were busily performing their parental duties. In one part of the cliff a windhover had taken up its abode, and we were highly amused by watching the occasional concerted attacks made upon him by jackdaws, which did not seem to relish such a formidable neighbour. On an old wall we found *Linum catharticum, Saxifraga tridactylites, Linaria cymbalaria, Arenaria serpyllifolia, Sagina, Lactuca muralis, Asplenium ruta muraria*, several specimens of epilobium, and last, and most noteworthy of all, *Meconopsis Cambrica*. The finding of this last fairly astonished us, as its station is much to the west and north of us. Has it previously been recorded from this part of Kent? The small stream along the roadside was profusely ornamented with brooklime (*Veronica beccabunga*), *Potentilla anserina*, the Siums, &c. A wall, alongside which flows the stream, was covered about its base with the lovely golden saxifrage (*Chrysosplenium oppositifolium*).

From here we followed the course of the stream, and were rewarded by once more finding many an old floral friend, the sight of which recalled to us other days. A pleasant ride home in the cool evening air, enlivened by the richly-modulated song of the nightingale, the peculiar thrilling notes of the nightjar, and the mellow call of the cuckoo, brought our much-enjoyed afternoon to a close.

New Brompton. J. M. HEPWORTH.

COCKATOOS.—It may interest some of your readers to know that a rose-breasted cockatoo which I have had in my possession for eighteen years, and kept quite alone, laid an egg in its cage on March 13th. It is white, and of an oval form.—*G. A. D.*

"IN studying a flower, the first thing to do is to look at it well, so as to get a good notion of its general form and appearance; and in proceeding to dissect it, the beginner must start with the idea that he has a machine made of several parts, more or less complicated, to pull to pieces."—*Masters's "Botany for Beginners."*

HYDROZOAN ZOOPHYTES.

AS I wished to examine a few small zoophytes, I established a tiny aquarium in a small glass vessel, fitted up with appropriate seaweeds; in a few days I discovered a group of four hydrozoan polypes, on a frond of small weed. They were stiff and rigid, having each four tentaculæ. I took them for a young growth of *Coryne pusilla*, or something,

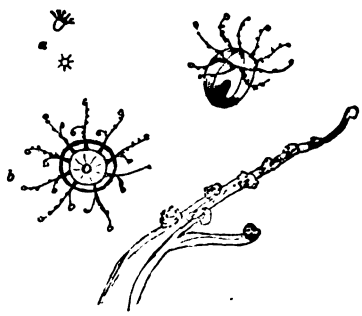

Fig. 94. Hydrozoan Zoophytes (*Coryne pusilla*) on sea-weed. *a*, nat. size of young Medusæ. *b*, ditto magnified as seen when attached to glass.

of the kind. Soon after a little knob appeared on one of them, and then on the others the same thing took place, and the number of polypes increased. I did not notice them much, until one morning I was surprised to see a beautiful little medusa swimming in the glass. I immediately thought of the "buds" on the polypes, and on looking for them I found that one was still "on the stocks," so far matured

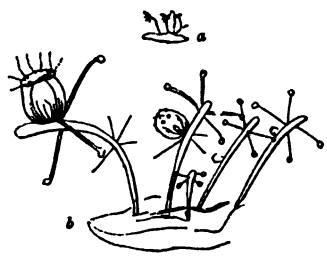

Fig. 95. Hydrozoan Zoophytes (*Coryne pusilla ?*); *a*, nat. size of cluster; *b*, magnified.

as to be quite recognizable. It took, however, five days before it got free, and it was almost comical to see its efforts to pull itself away from the stem. They are now still very lively, swimming about, and often visiting the spot where others are growing. The stem gradually dried up after the medusa was free. I should much like to know if any one had made these observations before. L. R.

NOTES ON THE STARLING.

ALTHOUGH we have many of our small birds protected, there are yet some for those who love to raise young birds from the nest, and perhaps one of the most beautiful is so left, for few birds are more handsome than the Starling (*Sturnus vulgaris*), and certainly none more deserving attention, for, added to his spotted, richly-shaded, purple and gold feathers, he has a talent which should recommend him to all lovers of the feathered tribe,—he is a good mocking-bird, and may be taught to talk and whistle several tunes by simply repeating them at feeding-time, or a few times during the day. The starlings are not migratory birds, but congregate in large flocks, when they are sometimes seen darting and floating after the manner of the swallow, feeding on the wing, rising and falling in a most pleasing way; yet with all their gambols they display much caution,—ever wary,—indeed, in some instances they are like the magpie; but when tame the whole of their ability may be turned to good account. See one at home in a hole in a tree or under the eaves of a cottage. Cunningly he selects his abode for the rearing of his young, sometimes but a few feet from your door, whence he may be seen to dart into a hole or cleft in a tree with food for its young, and we soon see the sleek, well-fledged young, peeping after the parent, and in the month of June the brood is led forth to learn to provide for themselves. Busily they may be seen in the sheep-walks, seeking food close to the feet of cattle, giving us an illustration of their instinctive cunning. But at this time we have not the elegant bird before mentioned—he is yet wearing his dusky feathers. In the month of July or August he begins to moult, and we shortly see those beautifully spotted feathers which transform this bird of exquisite symmetry into one of our handsome English mocking-birds. The Starling is insectivorous, very hardy, easily raised from the nest, and becomes remarkably tame. The cruel practice concerning the cutting of this bird's tongue is all nonsense; the bird will talk much sooner and better if his tongue be not cut. The nestling starlings should be fed with scalded bread, fig-dust, hard-boiled egg, and a little bruised hemp-seed, well mixed; or you may give them fig-dust and raw meat, taking care to prepare them fresh food daily. As soon as your nestlings can feed themselves, they should have a cage as large as the blackbird's cage, taking care to keep them very clean, allowing them to be plentifully supplied with water, and the cage well gravelled. CHAS. J. W. RUDD.

"SMOKING flowers with brimstone is a very good, simple, and cheap way of drying flowers, especially asters, roses, fuchsias, spireas (red flower kinds), ranunculuses, cytisuses, &c."—*Burbidge's "Domestic Floriculture."*

TERATOLOGICAL NOTES.

AUGUST 1st.—Noticed to-day a fuchsia, of which the leaves were arranged in three different ways: not only on the same plant, but also on the same branch, there were leaves opposite, alternate, and in whorls of three, and on one branch two whorls of three leaves each, bearing a flower-bud from the axil of each leaf. Are we to suppose that this is caused by a non-development of internodes, or is there a better theory to account for it?

(N.B.—I believe Mr. Lindley is in favour of the suppression of internodes.)

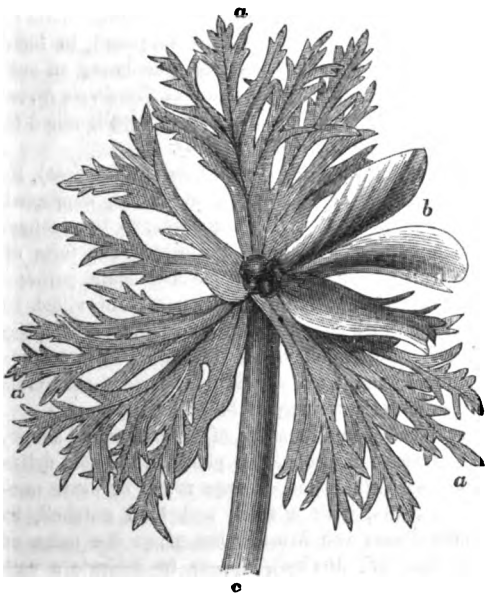

Fig. 96. Garden variety of *Ranunculus Asiaticus*—*a*, the 3 folioles of the Calyx, or Involucre; *b*, the coloured inner foliole, or abortive petal; *c*, the foot-stalk of the Flower.

May 16th.—On rich, light, sandy loam, in Church Cemetery, Nottingham, an abnormal specimen of *Trifolium pratense* or of *T. medium* (Bentham); the whole plant apparently full and healthy. Examined three heads of flowers, two of which exhibited the monstrosities.

The following is a description of one of the flowers, and may be accepted as a type of the rest:—

Calyx.—In two whorls; the inner of four, the outer of nine sepals. *Sepals.*—Divided halfway to the base, with subulate teeth.

Corolla.—Nine oblique petals, arranged in an apparently rosaceous manner (these situated between the outer and inner whorls of the *calyx*), then five small, unequal, crumpled organs inside the inner whorl, and seemingly stuffing up the centre of the flower, and not all on the same plane, but crowded upon the central column. *Petals.*—The outer ones red-purple, the inner quite green; unguiculate, and the nine outer ones incurved one over the other, like the blossom of an apple, but more crowded.

Stamens.—Eleven perfect ones cohering into a central solid column, and about six very imperfect green filaments at the top; these were all of various lengths, and scattered amongst the imperfect petals upon and around the column.

Pistil.—No trace, though the column, solid from the centre to the top, appeared looser in texture at the base.

The spikes of flowers were very fine ones. On them were counted 41, 45, and 66 flowers, the latter one having no abortive ones;—at least, none were noticed. The monstrosities were all at the base of the spikes, those flowers at the top being pretty regular, though every flower on the two heads appeared to possess more than its normal number of *sepals*, the average being 6-fid.

June 9th.—A lady found to-day a specimen of the red garden daisy, with one large centre flower, the involucre very loose and spreading, and having fifteen other daisies, half the size of the central one, springing from between the scales of the involucre. This is, I believe, a very good specimen of the Hen-and-chicken daisy.

June 23rd.—While plucking some flowers from a plant of the common blue lupine, noticed a peculiarity about the leaves. The leaves of this well-known plant are commonly on long stalks, with a number of lanceolate leaflets arranged in a stellate manner upon the top of the stalk, and all upon the same plane. In this case, however, the leaflets appear to be arranged in two or three rows, and in a spiral almost imperceptible, excepting that they are alternate with the ones above. One of the leaves consisted of 29 such leaflets.

July 21st, 1873.—Perhaps the following is as good an illustration of the transitions between *sepals* and *petals*, &c., as could be found in the Ranunculus family. A garden variety of *Ranunculus asiaticus* produced, instead of a flower, one long stalk, on the top of which were three green expansions of a leaf-like form, and one within, and alternate, of a bright red colour, and of remarkable shape. The best idea of their appearance may be formed by supposing the involucre of the Wood Anemone (*A. nemorosa*) to be formed of three sessile leaflets, one-third of an inch broad at base, and divided from halfway up into numerous divisions, like the ordinary leaves of the species. Within these, and springing from the same centre, one tripartite flattened expansion, coloured red, the two lobes entire, the other one approaching the divisions of the leaves, and coloured with green streaks up one side. The illustration may make this plainer.

RECENT PALÆO-BOTANICAL RESEARCHES IN VICTORIA (AUSTRALIA).*

WITHIN the last four or five years a considerable amount of light has been thrown upon the Tertiary flora which flourished in the south-eastern portions of the continent of Australia, previous to and during the deposition of the matrix of a large portion of the alluvial gold which has been obtained from that auriferous region. Through the researches of Baron von Mueller, M.D., F.R.S., with material collected and supplied by Dr. R. B. Smyth, F.G.S., the energetic Secretary of the Victorian Mining Department, and Mr. Mining-Surveyor Lynch, a fine series of fruits and seed-vessels have been described, and their affinities determined, so far as the remains would permit, from one of the "deep-leads" of the colony. The results of these investigations have appeared from time to time in the "Reports of the Mining Surveyors and Registrars of the Colony of Victoria," accompanied by lithographic illustrations of the fossils, executed by the lithographer to the Department, Mr. R. Shepherd. An interesting paper on the same subject was read before the Geological Society, but was published only in abstract.

The fossils in question were obtained from the auriferous "wash-dirt" of the Haddon "lead," Smythe's Creek, Smythesdale, county of Grenville, and were found at the bottom of the "wash-dirt," near the up-turned edges of the bed-rock (Silurian). This stratum, at both spots at which the fruits were found, and separated from one another only by a short distance, was succeeded by a gravelly drift containing trunks of trees. This, in one instance, was overlaid by alternations of clay and sandy drift, in the other by similar beds, and a thick bed (100 ft.) of basalt ("blue-stone"), giving respectively sections of 76 ft. and 156 ft.

Coniferæ are represented by a usually five-celled woody strobilus, to which the name of *Spondylostrobus* (*S. Smythii*), F. v. M., has been given. The generic affinities of this pentamerous conifer place it near *Solenostrobus*, Bowerbank, from the London clay, but, unlike the latter, the five fruit-valves are unkeeled, and there is a considerable columellar development not seen in the London clay genus. The last-named character is considered by Baron von Mueller as sufficient to separate it from all cupressaineous genera, fossil or recent.

The *Sapindaceæ* are perhaps represented by spherical or oval two- or three-celled fruits, the valves of which separate completely to the base, and are externally rough and deeply wrinkled from verrucular protuberances. Von Mueller has named these *Phymatocaryon* (*P. Mackayi*), and consider that they also approach London clay forms, viz., *Cupanoides*, *Tricarpellites*, and *Wetherellia*.

A series of globular one-celled bony fruits, deeply perforated at the base by an oval aperture, and not clearly related to any known genus of recent or fossil plants, are described under the name of *Trematocaryon* (*T. McLellani*), F. v. M., and are demonstrated as possessing characters in common with both *Verbenaceæ* and *Sapindaceæ*, but that the balance appears to weigh in favour of a reference to the former family.

The next genus of this interesting genus is that announced by Baron von Mueller as *Rhytidotheca* (*R. Lynchii*), for the reception of elongate and attenuate, five solid-valved fruits, wrinkled or rough at the dorsal portion, and without a columella or free central axis. These are supposed to have belonged to a meliaceous tree, possessing an outward resemblance to the fruit of *Flindersia Strzeleckiana*, F.M., but probably more closely allied to the satin-wood tree (*Chloroxylon*).

Under the name of *Plesiocapparis* (*P. prisca*), F. v. M., is described a large, one-celled, depressed and globular fruit, having a diameter of two inches, and a hard, almost bony, pericarp. The form of this fruit and shape of the seeds indicate, perhaps deceptively, the Baron remarks, a plant allied to the caper-bush (*Capparis*), approaching perhaps the *C. Mitchelli*, Lindley, an Australian desert tree, found existing from the Murray River to the Gulf of Carpenteria, a range of 20° of latitude.

So far as a small amount of material would admit, the presence of proteacean plants in the gold drifts has been established. Large round or ovate one-celled fruits, with a thick and hard nutshell, to which Baron von Mueller has given the name of *Celyphina* (*C. McCoyi*), appear to indicate a tree closely allied to *Helicia*. This supposition is borne out by the occurrence of other bony compressed rounded fruits, smooth and bivalved, measuring about two-thirds of an inch, and distinguished under the name of *Conchotheca* (*C. rotundata*), with a general resemblance to the fruits of some tropical *Gevilleæ*, but still differing from them.

Finally, the term *Odontocaryon* (*O. Macgregorii*), F. v. M., is applied to certain fruits of undetermined affinity, ovato-globular, uni-locular, and terminated by four large unequal teeth, and derived "probably from a large evergreen tree," whilst that of *Penteune* (comprising three species, is given to certain five-valved, ovate or globose fruits, with exceedingly thick and woody valves, and without a central axis. The general conclusion to be arrived at by Baron Mueller's very interesting investigations amongst these vegetable fossils of the gold drifts appears to be that, at the time of the deposition of the sediments in question there existed in that part of Australia now comprised within the

* Reports of the Mining Surveyors and Registrars of the Colony of Victoria, for the Quarters ending March 31st, 1871; June 30th, 1871; September 30th, 1871; September 30th, 1873; December 31st, 1873. Melbourne: By Authority.

limits of Victoria, and perhaps further, a flora representing a warmer climate than at present existing. Of such a nature are those fruits described under the names of *Rhytidotheca*, allied to the satin-wood tree; *Celyphina*, probably allied to *Helicia*, a genus of east and north Australia, and tropical Asiatic trees, but not now living in Victoria, whilst *Conchotheca*, perhaps one of the tropical *Gevuineæ*, bears no resemblance to any member of the family at present comprised in the flora of Victoria. Lastly, we must not lose sight of the affinities borne by some of these fossil fruits to those of the London clay.

R. E., Jun.

THE MOUTH OF THE CRANE-FLY.

THE following description of the mouth of the Crane-fly must be taken by the readers of Science-Gossip *quantum valeat*, as addressed by a "Student and Lover of Nature" to "Students and Lovers of Nature." It consists in great measure of a comparison of the mouth of this insect with that of the Blow-fly, as described in Mr. Lowne's "Anatomy of the Blow-fly,"* and in offering it for publication I venture to hope that while it may contain a sufficient substratum of truth to render it acceptable to the public, any inaccuracy of statement into which I may have fallen will be kindly corrected by those who may be qualified for the task. I pass over any general description of the mouths of insects, as this has been lately in much better hands than mine, and for the sake of those to whom the subject is new, will commence with a few remarks, chiefly explanatory of terms which I shall have occasion to use, and without which I cannot make my meaning clear, and shall conclude with a short account of the *modus operandi* employed in my dissections, with a view to encourage those who might wish to follow them out, but who may possibly be deterred by over-estimating the difficulty of so doing.

When two different creatures are compared, and certain parts in the one are found to correspond with, and to take the place of, similar parts in the other, then, however different may be the office they fulfil, the parts are said to be homologous, and the one part is said to be the homologue of the other. Thus, the arm of a man and the wing of a bird are said to be homologous parts, and also in the insect before us, the balancers which take the place of the second pair of wings in such as have two pairs, are said to be the homologues of that second pair.

The use of the term "plate," as applied to designate a portion of the integument of insects, should be well understood. It is not intended to indicate any separation of parts. It is important to bear in mind that the integument of insects forms a continuous covering in which no break can be found, over every part of the creature. Certain parts are, however, strengthened by the deposit of a horny substance, called *chitine*, and these are more or less distinguishable as plates, from the intermediate soft and transparent portions which connect them with one another. An examination of the abdominal plates of a fly or a beetle will best illustrate this.

Each of the parts of the mouth of an insect being a hollow organ has an external surface or plate, and an internal ditto. Those belonging to the labium have been recognized respectively as the mentum and the posterior labial plate, or floor of the mouth, mentioned by Mr. Lowne.* I have not seen any similar distinction in the case of the labrum, but shall introduce it for the purpose of my description, calling *a* the external plate of the labrum, and *b* the internal plate of the same, the latter being also the part referred to as the roof of the mouth, as opposed to *b'*, its floor.

With reference to the salivary duct, of which mention will hereafter be found, I should say that the saliva of insects is an acrid juice, secreted by special glands situated in the thorax, and emptying their contents by appropriate ducts either into the cavity of the mouth, or into the commencement of the stomach. Its penetration into the wound is the cause of the irritation produced by the bite of various insect-pests, with which we are all familiar. It only remains for me to add that if the head of the insect be cut off and placed with the antennæ uppermost, that surface of the head which bears the antennæ will be the superior surface; the use of the terms inferior, anterior, posterior, and lateral will not need further remark.

The head of the Crane-fly consists of a somewhat globular chamber bearing the great compound eyes and the antennæ, from the fore part of which arises a cylindrical prolongation which I recognize as the rostrum described by Burmeister,† and stated by him not to form a distinct organ, but to be merely a continuation of the corneous covering of the head. The parts of the mouth or trophi, as they are sometimes called, which form the subject for our present consideration, are situated at the extremity of this rostrum; some of them are, however, prolonged internally some distance into the head. They are as follows, viz:—

I.—The labrum, consisting of—

1. An external plate.
2. An internal do., forming the roof of the mouth.

* Such references to this work as require an acquaintance therewith I shall insert in the form of notes, which may be disregarded by the general reader.

* Lowne's "Anatomy of the Blow-fly," p. 47.

† Page 51, Shuckard's Translation, 1836.

II.—The labium, consisting of—

1. An external plate or mentum.
2. An internal do., forming the floor of the mouth.
3. A plate attached to the anterior border of the last named.
4. A pair of lobes.

III.—The maxillæ and their palpi.

In addition to these I must notice a fourth organ, viz, the pharynx, concerning which I am somewhat

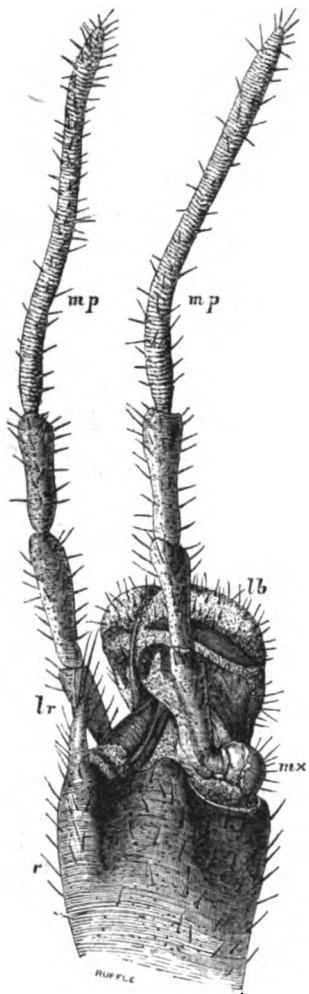

Fig. 97. General view of mouth organs of Crane-fly, × 24—*r*, *rostrum*; *lr*, labrum; *lb*, labium; *mx*, maxillæ; *mp*, maxillary palpi.

doubtful whether it can properly be regarded as a portion of the mouth and not rather as the distended commencement of the œsophagus. I find it, however, difficult to persuade myself that it is not the homologue of that which Mr. Lowne has described under the same name as forming part of the basal joint of the proboscis of the Blow-fly, and shall therefore include it in my account of the mouth organs here.

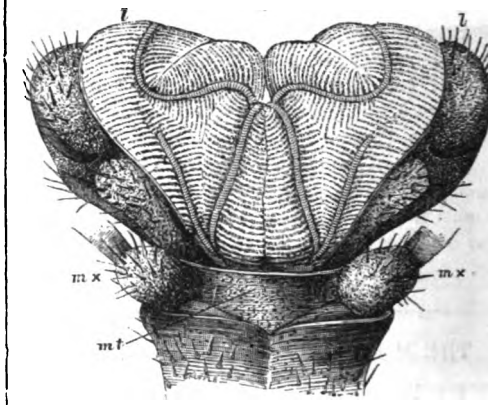

Fig. 98. The labium from beneath, × 48—*ll*, the lobes; *mx*, maxillæ; *mt*, mentum.

Fig. 99. One of the main false tracheæ, with branches, × 210.

Fig. 100. Terminal portion of salivary duct, × 210.

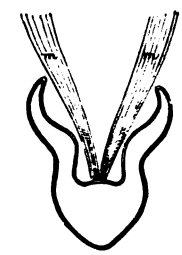

Fig. 101.

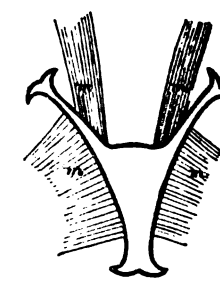

Fig. 102.

Fig. 101. Anterior section of pharynx (the lettering in this and following figs. indicates the position of the muscles) × 90.

Fig. 102. Posterior section of ditto, × 90.

It will be noticed that the above enumeration does not include, 1st, the mandibles; 2nd, the paraglossæ; 3rd, the labial palpi; and 4th, the tongue.

The mandibles are either not present or are very obscurely represented, as will be noticed further on. The paraglossæ are, I believe, to be recognized under

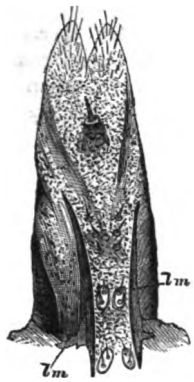

Fig. 103. Labrum from beneath, × 48—*lm*, lobes of maxillæ.

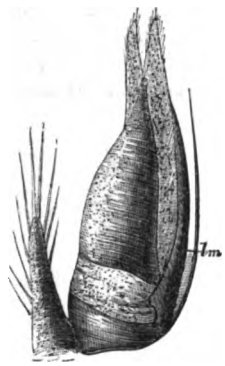

Fig. 104. Side view of ditto, × 48.

above parts in detail and in the order indicated, taking first—

I. The labrum, which consists externally of a triangular horny plate terminated in front by two fleshy pointed lobes; it is situated immediately beneath a snout-like process in which the rostrum

Fig. 107.

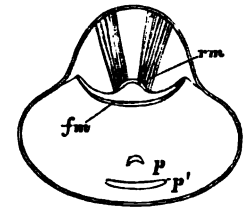

Fig. 108.

Fig. 107. Group of minute spines from terminal joint of palpi, × 210.

Fig. 108. Section of Rostrum in line shown by fig. 106, × 24—*rm*, roof of mouth; *fm*, floor of ditto; *p p*, processes attached to lobes and mentum respectively.

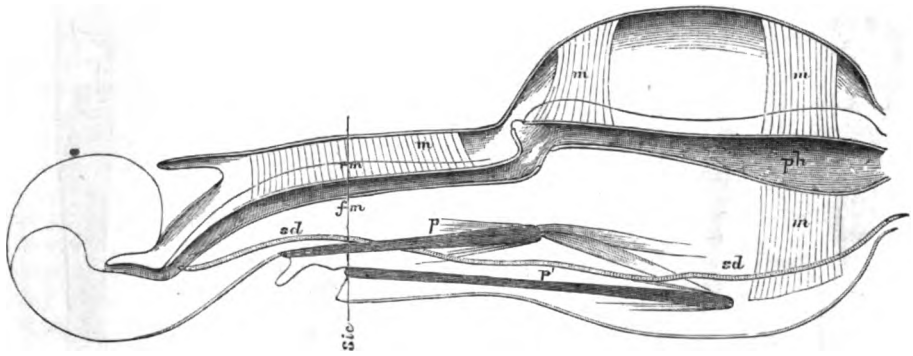

Fig. 106. Longitudinal section of head and mouth, × 24—*p.h*, Pharynx; *sd*, salivary, duct;—rest of lettering as before.

the altered designation of the lobes, though I have not seen this formally so stated, and shall be glad to be confirmed in my opinion if correct. The labial

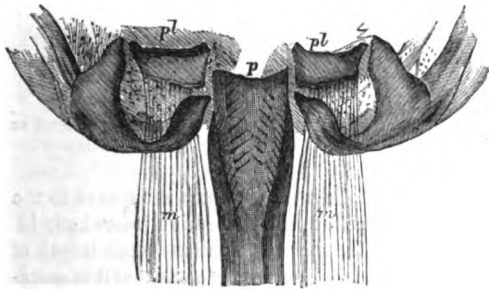

Fig. 105. Articulation at base of lobes, × 120, *p* process; *pl*, plates to which muscles are attached.

palpi and the tongue are absent, unless a minute projection in the floor of the mouth, where the salivary duct enters, may represent the latter organ.

I will now endeavour to describe each of the

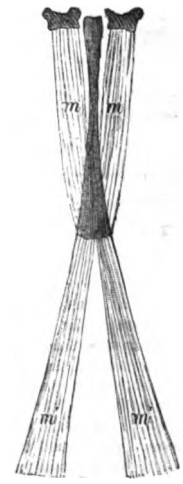

Fig. 109. Process of lobes with muscles attached—*mm*, those connecting it with back of head, × 24.

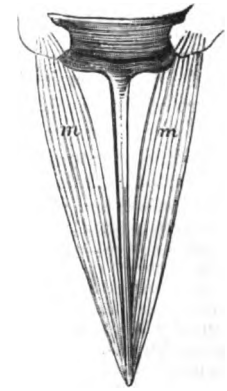

Fig. 110. Process of mentum with muscles attached to maxillæ, × 24.

terminates above, with the anterior edge of which it is connected by a membranous band which allows it some freedom of motion. The internal plate of the labrum which forms the roof of the mouth is connected in front with the part just described, but is prolonged behind almost the whole length of the rostrum; it is grooved longitudinally along the centre of the groove forming a cavity which can be greatly enlarged by the action of two muscles which arise one on each side of it for a considerable distance and are inserted above in the integument of the rostrum. The lateral portions of this plate which are connected with the floor of the mouth are very thin and yield ing, thus allowing easy play to the action of the muscles in question. A pair of slightly curved and horny rods are developed in the membranous integument, one on each side of the external triangular plate, which I suspect to be portions of the maxilla.* A few sets arranged in pairs may be noticed between them.

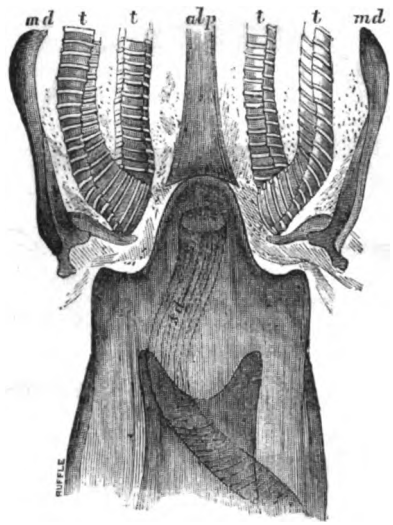

Fig. 111. The opening of the mouth, × 130—*alp*, anterior labial plate; *t t t t*, main false tracheæ; *md*, rudimentary mandibles.

II. The labium is the most complicated of the organs of the mouth, and consists, as before stated, first of the mentum. This is a somewhat quadrangular plate attached to the lower anterior border of the rostrum, its anterior edge being connected with the base of the lobes. Its posterior border is thickened and produced into a long slender rod, which passes far back into the base of the head and gives origin to a pair of muscles which proceed to the maxilla. A slight inversion of the integument occurs between the rostrum and the mentum and again between this last and the base of the lobes.

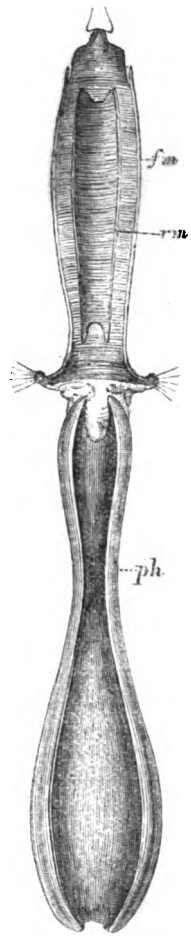

Fig. 112. Pharynx and mouth cavity from above—lettering as before, × 24.

Fig. 113. Anterior labial plate, × 210.

The floor of the mouth,* which is opposed to the roof of the same beforedescribed, is almostwholly included within the rostrum, along the whole length of which it extends. A transverse section of it is somewhat crescent-shaped, the concavity being uppermost. It is deeply channelled at the anterior portion,

* Those who have read Mr. Lowne's book on the Blow-fly, will remember that he describes a portion of the maxillæ as united with the labrum, and he further says that the portions so united are clearly the homologues of the terminal lobes of the maxillæ in bees, the lobes referred to being those marked *mx* in his drawing of the maxillæ and labrum of a Carpenter Bee, at p. 229 of SCIENCE-GOSSIP, in the number for October last. If this is the case, I apprehend that in the insect before us also the terminal lobes of the maxillæ may be represented by the curved rods referred to in the text, the remainder of these organs being recognizable in the stout basal pieces from which the four-jointed maxillary palpi spring.

* I believe this to be the homologue of the posterior labial plate described by Mr. Lowne at p. 46, though its connection with the mentum is not so clear as in the Blow-fly, inasmuch as the greater portion is internal, being entirely inclosed within the rostrum.

where it abuts on the part to be next described, and at the posterior extremity it is broadened and turned upwards, the two posterior corners forming knobs for the attachment of muscles. The anterior portion is united to the upper side of the mentum, and it is connected behind by a short membranous tube to the pharynx. At its anterior extremity, a minute eminence marks the surface of the salivary duct, and is the only representative of the tongue I can detect. This duct extends as a single tube through the head at the base of the brain, after which it divides, and leads to two small salivary glands situated in the thorax; it may easily be mistaken for a tracheal tube, but the rings are not so regular and perfect as in the latter, and near its extremity they assume a longitudinal instead of a circular direction.

Immediately in front of the floor of the mouth is a narrow thin plate,* which marks the line of division between the lobes; it is the third portion of the labium as above enumerated, the fourth and last being the lobes themselves. These are attached above the plate just mentioned, and are connected below with the anterior edge of the mentum. Their external surfaces are of a thickened miscellaneous texture, strengthened by a thick clothing of fine hairs, between which are interspersed others of a much larger size, and furnished with bulbous roots. A pair of narrow horny plates extend across them about the centre of their length, from the superior to the inferior surface; immediately behind which is another larger pair of a somewhat triangular shape, the posterior angles of which are connected by a complicated articulation with a handle-like internal process, which arises from the junction of the mentum with the base of the lobes. These parts together form a protective covering for the more delicate structure which ordinarily lies folded up between them. When expanded, however, this is seen to be a membranous sac, ornately marked with a fine tracery of false tracheal tubes; it is the essential feature in this part of the organism, not perhaps so elaborate in its details as that of the Blow-fly, but nevertheless forming a very beautiful and instructive object for microscopic display. The false tracheæ, as they are called, are deep-channelled folds in the transparent membranes, kept open by incomplete rings, which differ from those of the Blow-fly in being perfectly plain, instead of, as in the latter insect, forked at either end alternately. Four main channels arise immediately in front of the floor of the mouth, two on either side, and, gradually decreasing in size, take a sinuous course over the bladder-like membrane; from these a great number of smaller similar channels diverge at right angles, covering the whole surface of the organ, and forming a fine strainer, through which the fluid element of the insect passes on its way to the mouth. A pair of small chitinous hook-like thickenings of the integment, may be seen in front of the floor of the mouth, one on each side the origin of the false tracheæ, which are, I believe, the homologues of similar hooklets, which in the Blow-fly Mr. Lowne thinks may represent the mandibles.* The articulation of the base of the lobes with the anterior edge of the mentum presents several complicated parts which I have not been as yet able fully to understand; but the following may I think be made out. A stout handle-like internal process is borne by the base of the lobes between the posterior lateral plates, immediately over the slender rod-like process of the mentum before mentioned, and between it and the floor of the mouth; it is not so long as the process of the mentum, but like it, serves for the insertion of muscles, a pair of which are attached to its posterior extremity, and connect it with the back of the head: these seem to be retractors of the mentum and lobes, but how the converse movement of their protrusion is effected, I am unable to suggest. Another pair of muscles directed forwards are also attached to the posterior extremity of this process, and connect it with two small plates on either side of its anterior extremity, which form part of the complicated articulation above alluded to.

III. The maxillæ, and the maxillary palpi, will next claim our attention. The former are, I believe, represented by two stout joint-like pieces on each side of the mentum from which the four jointed palpi spring. I confess it was some time before I could understand these organs at all, and I feel I must even now speak diffidently on the subject. If the reader will turn again to Mr. Lowne's description of the mouth of the Carpenter Bee in the number for Oct. last, he will find the maxillæ of that insect described as follows:—"Each consists of a large outer knife-shaped lobe *mx*, strengthened by a prominent rib along its inner margin; of a small inner lobe densely covered with sensory hairs *mxr*; of a basal sheath *mxb*, and a rudimentary palpus *mxp*." Now I think that the minute horny rods before alluded to as existing in the integument on each side of the labrum in the fly, are homologous to the more highly developed and "knife-shaped lobes" of the maxillæ of the bee; that the joint-like basal pieces of the fly are the homologues of the "small inner lobes," and the "basal sheaths" of the bee, the palpi, which are so enormously developed in the former insect, being reduced to mere rudiments in the latter. My reasons for this opinion have been already alluded to when speaking of the labrum, and I will only now ask the reader to accept this explanation in default of a better.

* I think this is the anterior labial plate of Mr. Lowne. (See p. 47.)

* Lowne's "Anatomy of the Blow-fly," p. 47.

The maxillary palpi originate from the maxillæ just described. They are very prominent objects, being relatively much larger than the same organs in most other insects. They are directed forwards and slightly upwards, and consist of four joints each, the last being nearly as long as the three first together, and of a more membranous character; it is covered with minute chitinous spines, arranged in groups of four or five. I suspect that in these terminal joints of the palpi, the chitinous substance is imperfectly deposited, only occupying the centre of each cell, where it assumes the form just stated, and leaves the edges transparent, thus giving a somewhat membranous appearance to the joint.

The pharynx is the last of the organs with which I have to deal. It is connected by a short membranous tube with the cavity of the mouth, and extends through the brain to the back of the head, where it is continuous with the œsophagus.* A section near the fore part shows a double wall, or, as I prefer to regard it, one continuous integument bent in upon itself on the upper surface, thus forming a deep groove, from the bottom of which a pair of muscles arise which are inserted above in the integument of the head between the eyes. The posterior portion, however, exhibits a section materially modified, which somewhat resembles the letter Y, the extremities of which are curiously folded over. The horny substance being thin and yielding along the line of the folds, allows of the central cavity being very much enlarged by the action of four muscles, two of which corresponding to the two already alluded to on the anterior portion, arise from the superior groove or fork of the Y, and are counterbalanced by two others arising from the lateral portions of the same, all four being inserted in the integument of the head. The main design of this arrangement is, I think, obvious, though I cannot state it in detail. The (perhaps alternate) action of the muscles attached to the pharynx and the roof of the mouth, evidently effects the ascent of the fluid aliment upon which the insect feeds, the propulsion of which into the œsophagus is brought about by the elasticity of the walls of these two cavities.

With regard to the *modus operandi*, I would observe, in the first place, that a sufficient number of specimens should be obtained,—thirty or forty will not be found too many, as some will probably be spoiled in first efforts, before much is learnt from them. When the object is large, it may be pinned to a loaded cork at the bottom of an empty sardine box, improvised as a dissecting-trough, as advised by Mr. Gedge (see S.-G. for August, 1866), and filled with water just sufficient to cover the object. It this be too small, however, as in the present case, to admit of the use of pins, it will be better to place it in a shallow cell or even in a drop of water on the surface of a slide.

The magnifying power employed need not be very great; for most purposes I have used a lens removed from an old telescope, but where greater amplification is needed, I have used the inch objective of my microscope, which answers the purpose very well. A few specimens should always be examined in a fresh condition just killed, which is easily done by placing them for a few seconds in spirits of wine. When this cannot be done, they should be allowed to remain in the spirit for the purpose of preservation; the appearance of the tissues however is much altered and by no means improved by the process. For examining the integument it will be frequently desirable to soak the insect for a few days in liquor potassæ to remove all the soft parts. Sections should be made in different directions, and the parts teased out with needles; any skill which the operator may possess in drawing should be freely made use of to delineate each portion as soon as it is satisfactorily made out; indeed, some effort to do this is indispensable in order to retain information once acquired, or to communicate it to others. If any further requisite be necessary, I can only sum it up in two words—"patience" and "perseverance."

A. Hammond.

4, *Neptune Terrace, Sheerness.*

* This connection of the pharynx with the cavity of the mouth on the one hand, and with the œsophagus on the other, together with its evident similarity of function, induce me to regard it as the organ described by Mr. Lowne under the same name in the Blow-fly; but I find it difficult to understand how it is, that while in the insect just named it is closely connected with, and indeed described by that gentleman as forming part of the basal joint of the proboscis,—viz., the third or maxillary segment; in the insect before us it seems totally dissevered from any such union, occupying as it does the globular cavity of the head, and far removed from the maxillæ altogether.

MICROSCOPY.

Mounting in Glycerine Jelly (p. 88).—Though I have sometimes found this medium useful for small objects without a cell, with larger ones and cells I cannot speak so well of it. The jelly, after a year or so, shrinks, bending the covering glass, and if the mount is of any size, the jelly is apt to crack, unless air can get in at the side. I lately had to turn upwards of a hundred slides out of my cabinets through this fault; fortunately I had been cautious enough to mount only a few, and only common specimens.—*E. P. P.*

A Problem in Mounting (p. 89).—I have not unfrequently seen the phenomena Mr. Laing speaks of, and, like him, I have watched the apparent air-bubble develop. I once spoke to one of our leading mounters, who told me he had to contend

with the same thing, and that sometimes a quantity of seemingly good slides would two days afterwards be faulty. Mr. Laing deserves the thanks of all who occasionally meet with the difficulty, for telling us of the remedy.—*E. P. P.*

Polariscopic Objects.—Having my attention drawn to some crystalline substance attached to the stamen of the white Azalea flower, which I found to be hard and very transparent, I placed it under the microscope, and, from its appearance, I thought it very likely to be a good subject for the polariscope, and so it has proved. On crushing the mass, every particle showed beautiful colours, except at the fracture, which appeared black; I suppose in consequence of the ray of light being refracted by the broken crystals. I then applied a drop of clear water, in which it slowly dissolved, at the same time retaining the brilliant colours until quite dissolved, when it became as colourless as the water. I then placed it under a glass to prevent dust settling on it, and it very slowly again crystallized in beautiful stellated forms in about forty-eight hours. Under the polariscope it produced the most gorgeous colours imaginable. On opening the flower of the Azalea, a drop of very clear saccharine liquor may be obtained; put this on a glass slip without adding water, and it will show the very beautiful crystals in a few hours. On having this substance analyzed, it proved to be perfectly pure sugar.—*James Fullagar.*

A "Life Slide."—Mr. D. S. Holman, of Philadelphia, has recently brought out a "life slide," in which living objects of a certain size can be retained under observation for weeks together. A current of water is made to flow continuously through the chamber containing the object, so that the processes of respiration, circulation, nutrition, &c., as well as the effects of certain poisons, can be studied under perfectly natural conditions. The transparent chamber in which the animal is contained has a fine perforation at each end, too small to allow of the escape of the animal, but sufficient to maintain a flow of water. The latter is effected by means of tubes and glass jars, or reservoirs, on the siphon principle. An illustration of this "life slide" appears in the *American Naturalist* for April.

Structure of the Potato.—Mr. T. Taylor has recently shown that the vascular bundles in a potato may be easily seen by cutting a potato in two through its axis (the section also passing through some of its "eyes"), and coating the cut surface, first with a solution of bichromate of potash, and afterwards several times with a strong tincture of iodine, which will stain the starch blue, but leaves the vascular bundles yellow. The air-ducts will then be seen to extend invariably to the eyes. For microscopical study these sections are to be made and treated with a strong acid or caustic alkaline solution, which will dissolve the starch, but leave the bundles unaltered. The sections may then be mounted as usual. To isolate the vascular bundles, place a potato, skinned without wounding the "eyes," in a solution of sugar and water (two ounces to the pint) and keep it at a temperature of 72° F. for nearly a fortnight. The fungus of fermentation will reduce the potato to a pulp, except the vascular bundles, which may be mounted in gum or balsam, and studied with a power of one hundred diameters.

ZOOLOGY.

Argas reflexus.—This arachnid is the *Ixodes marginatus* of Fabricius, *Rhynchoprion columbæ* of Hermann, and *Argas reflexus* of Latreille,—not Argus, which is a genus of Phasianidæ, as inadvertently printed in your last number. How truly the specific name of "marginatus" applies, is well shown in Mr. Fullagar's drawings. And it is noteworthy that these are the first engravings ever published of Argas in England, and that they are far better than any to be found elsewhere; facts surely creditable to the author as well as to Science-Gossip. It seems curious that, after this Canterbury *Argas* had been submitted, year after year, to all the most eminent experts in London, it should be left to the perseverance of Mr. Gulliver, jun., with the aid of Professor Westwood, to establish this species as new to Britain, though well known on the Continent. From all that appears, *Argas reflexus* is harmless; yet *Argas persicus*, which lives in houses in Persia, is said to be a dreadful creature, occasioning, by its puncture in the human subject, convulsions, delirium, and even death. Now the Canterbury Argas has been so well engraved and described in Science-Gossip, probably the same species will be found and recognized in other British localities.—*E. R.*

"Utilizing" Poisonous Snakes.—Probably no more ingenious method of committing murder was ever devised than one which is not unfrequently resorted to by the natives of Bengal. As it is, I am sure, new to most of the readers of Science-Gossip, and will have a ghastly interest to all, I will briefly describe it. There is in that part of India a class of gipsies, who are well known to be skilful snake-charmers. To one of these men the would-be murderer applies, and in return for a trifling fee is speedily furnished with a living cobra. In order that he may be enabled to handle the venomous creature with safety to himself, it is secured in the following manner:—"A bamboo is cut from the jungle of the length required, of course as long as the cobra. Then the creature is shoved in, with

its head just appearing at one end and its tail at the other. The tip of the tail is then turned up and tied to the bamboo." The murderous weapon is now complete and ready for use. Armed with his cobra-stick, the murderer creeps softly to his enemy's tent in the dead of night, cuts a hole in the wall and pokes in the deadly weapon. The tortured reptile, careless upon whom it wreaks its animosity, strikes its fangs into the sleeper, then is withdrawn, and the murderer steals away as softly and silently as he came. My authority for the foregoing account is unimpeachable.—*John Landels, Kirkcaldy, Scotland.*

THE MANCHESTER AQUARIUM.—A new aquarium, well stocked with marine and fresh-water fish, has recently been opened at Manchester. The sea-water is brought by train in barrels from Blackpool, a distance of about forty miles, and a constant supply is maintained.

CUCKOOS AND THEIR YOUNG.—A letter in SCIENCE-GOSSIP either last year or the preceding one, mentioned the writer's surprise, on searching for a newly-laid cuckoo's egg in a nest she had just left, to find one on the point of hatching. He expressed his belief that further observations might prove the cuckoo not such a careless parent as she seemed. I was in a market-garden lately and remarked to the owner that cuckoos seemed very plentiful this year. He told me that he frequently saw the old cuckoos perching on his espaliers with their young broods; that they would sit so still as to be more like stuffed birds than live ones, and then they would drop down suddenly, pick up a dew-worm and feed a young one, and again repeat the process. This he spoke of as a common event. I told him that it was not a generally well-known one, and asked if he would object to its being named on his authority, as it might bring questions upon him. He does not object; therefore I mention his name and address,—*Mr. Jerome Delicate, Redworth, Heighington, Darlington.*

ARRIVALS OF MIGRATORY BIRDS.—Nightingale, April 9th; Cuckoo, April 19th; Swallow, April 25th; Corncrake, April 30th.—*T. P. B., Wrotham, Kent.*

BOTANY.

GEUM RIVALE (p. 137) is given by Mr. Watson ("Topographical Botany," p. 139) as a plant of West Sussex, on the authority of Mr. Borrer.—*James Britten.*

ENGLISH PLANT-NAMES.—May I draw the attention of the readers of SCIENCE-GOSSIP to the fact that Mr. Holland and myself hope to publish Part I. of our "Dictionary of English Plant-names" during the present year? Any names will be thankfully received by *James Britten, British Museum, W.C.*

SAXIFRAGA GRANULATA.—*Apropos* to the discussion raised in your columns upon the root of *Saxifraga granulata*, I may mention that I found the other day, near Winchester College, a specimen with a string of the so-called bulbs attached to the stem by a small rootlet, reminding me somewhat of the root of *Lathyrus monorhizus* (*Orobus tuberosus*).

SINGULAR GROWTH OF WILLOW-TREES.—I am not aware that any one has noticed in print a curious way in which young willow-trees are sometimes produced. In marshes near Northfleet, where there are a number of these trees that have been scooped out by the labours of the Goat caterpillar, and the diligent jaw-work of smaller insects that have followed, the empty space in the interior by degrees in several of these has been partly filled by a stratum of mould, formed of dead leaves, &c.; and into this some of the ripe seed-pods falling, have produced sapling willows, which have sprung up to a good height within the parent tree, the outer shell of which still retains its vitality, and puts forth leaves, if not blossoms, as when in its healthy condition.

RAPHIDES AND CUTICLES.—USE OF POTASS IN PHYTOTOMY.—No wonder your correspondent "G. H. J.," in SCIENCE-GOSSIP (No. 114, p. 141), has to ask questions on such simple and useful matters as the separation and display of plant-crystals and cuticles, for, as regards the subject of histological phytotomy, especially on these very points, our late treatises are by no means up to the present state of knowledge. The old works of Raspail, Lindley, and Hutton Balfour have more accurate information on such subjects than is to be found in our most recent and loudly-praised botanical works. As to the severance of the cuticles from their connections, and exposure of raphides, short crystal prisms, and sphæraphides, the best plan is to boil the leaf or other part for a few minutes in a solution of caustic potass; then transfer the vegetable texture to a pan of pure water, and separate or tease out the cells, membranes, fibres, and other parts by means of needles. Delicate manipulation, which a phytotomist so earnest as "G. H. J." will soon learn, may then be very effectually employed, and with surprisingly satisfactory results. The liquor potassæ of the Pharmacopœia will answer well, either pure or diluted. Professor Gulliver showed experimentally, at a scientific meeting of the East Kent Natural History Society, Oct. 2, 1873, how admirably this procedure answers with the short prismatic crystals in Leguminosæ, and with the sphæraphides and cuticle of the

leaf of the fresh tea-plant (*Thea viridis*), as noticed in his memoirs in the *Monthly Microscopical Journal*, December, 1873, and elsewhere. For any account of plant-crystals, like that given by him, with wood-cuts, in SCIENCE-GOSSIP, May 1, 1873, the botanist might look vainly into any of the most recent and popular books which are put into the hands of our pupils. But with the aid of potass, which may be safely boiled in a German glass test-tube over a spirit-lamp, and the subject ventilated and popularized in SCIENCE-GOSSIP, we may expect to promote a better knowledge than is at present current in this country of minute phytotomy.—*Q. F.*

ARTEMISIA CÆRULESCENS (p. 136).—No wonder that your correspondent (K. L. Grey) has not been successful in finding any description of *Artemisia cærulescens* in "ordinary botanical books." Its last public appearance as a "wild shrub" was, I believe, in the "English Botany" of Sowerby and Smith, where we are informed (No. 2,426) that Tofield had "assured Hudson that it grew wild near Boston, in Lincolnshire." Gerarde had long before also told us that in his days it occurred as a native in the Isle of Wight and some other places; but there can be little doubt that this was an error in both cases, and I am not aware that any other botanist has ever even professed to have met with it in the wild state; neither does its Continental distribution favour the possibility of its being indigenous in Britain. The Artemisia seen by your correspondent growing in such abundance close to the sea, was in all probability *A. maritima*, which is common enough in appropriate localities throughout the English coasts, and is also found, although more rarely, in Scotland. Babington, in his "Manual," gives a variety, the *salina* of Willdenow, with the flowers in unilateral racemes, which is perhaps the especial form intended by the writer of the notice. Between *A. cærulescens* and *maritima* there is no resemblance whatever.—*R. A. Pryor.*

LINNEA BOREALIS.—It may interest some of your readers to know that the above interesting little plant is growing vigorously and now flowering in our woods at Stanmore.—*E. Brightwen.*

SEASIDE SHRUBS (ATRIPLEX HALIMUS, &c.).—The notice in the April number of SCIENCE-GOSSIP on this shrub was written in ignorance of its having already been introduced on our coast and in Jersey as a seaside shrub. It appears, however, from A. Morley's statement in the June number of SCIENCE-GOSSIP, and in the May number by "I. I. M.," to be used for hedges not only in St. Brelade's Bay, Jersey, which is a sheltered spot, but is "found on a very elevated embankment (in the island) to protect the lower portion of a garden, where nothing but the alder will grow." A. Morley adds: "I have also noticed that it is being introduced into other parts of the island for forming thick low hedges between cornfields." K. Lilley Grey also informs us, in the June number, that it is "growing in hedges at St. Leonards, and seems to flourish well on the Hastings sandstone." In the newly-planted ornamental ground fronting the sea, on the West Brighton Estate, may be seen an embankment of earth raised to protect the shrubs and plants from the strong winds, with a dwarf dead furze fence on the top of the embankment, giving it an unsightly appearance. If, instead of the dead furze, the *Atriplex halimus* were planted thickly on the embankment, it would speedily grow to a dense hedge, and form a screen, which would be a durable and pleasing object. The shrub is not only adapted for the seaside, but in the south of France it thrives inland, and would be found in England a good protection in all exposed spots by sea or elsewhere. Neither of the notices above referred to gives any information as to its growth—whether it is slow or rapid, and whether the leaves are at all affected by the strong sea-breeze. As it is almost a stranger with us, any information on the subject by those who have observed its characteristics would be very acceptable to persons who may be desirous of cultivating it. I may here observe that the plan of an embankment (say about three feet high), with the Atriplex planted upon it, might be adopted with advantage on the Undercliff road at Brighton. When the shrub becomes better known, no doubt it will be extensively cultivated, not only as being ornamental, but as a protection or screen. Many of your readers must be able to add to the list of shrubs enumerated or referred to in recent numbers of SCIENCE-GOSSIP as suitable for seaside planting. Any information on the subject would greatly forward the object many have in view regarding their cultivation. It is probable that the *Juniperus communis* and the dwarf variety, *J. nana*, might succeed well as ornamental evergreens. Can any of your readers say if they have been tried by the sea, and where? They grow in the mountains in Wales, Scotland, and Ireland. Withering says the *J. nana* grows on the higher mountains of Scotland, and is abundant in the outer Hebrides nearly as low as the level of the sea. The *Juniperus prostrata* was growing many years ago in Brighton; it is a handsome evergreen, and likely to succeed by the sea, being prostrate, with horizontal branches spreading on the ground like the Cotoneaster. The French cultivate the *Juniperus Sabina* under the names of *J. compressifolia* and *J. tamariscifolia*, male and female. (See *Bon Jardinier*.) They resemble the *J. prostrata* in character and appearance, and would most probably succeed by the sea. They are abundant in Switzerland, on the road between Loesche la Ville and the Baths of Loesche at the foot of Gemmi Pass.—*W., Brighton.*

GEOLOGY.

ON THE LAST STAGE OF THE GLACIAL PERIOD IN NORTH BRITAIN.—This was the subject of a paper recently read before the Geological Society of London, by T. F. Jamieson, F.G.S. In this paper the author arranged the Glacial phenomena of Scotland under the following three heads:—1. The great early glaciation by land-ice (maximum effects of glaciation). 2. The period of glacial marine beds containing remains of Arctic mollusca, when most of the country was covered by the sea. 3. The time of the late glaciers, the special subject of the paper. After expressing himself in opposition to the hypothesis of a great polar ice-cap, the author described this last period as one not of mere local glaciers, but as characterized by a return of a great ice-sheet over nearly the whole of Scotland and Ireland; but he stated that this ice-sheet was probably neither so thick, so extensive, nor so enduring as that of the first period of glaciation, which cleared away everything in the shape of superficial deposits down to the hard rock. He believed, however, that in the last period the mountains of Scotland and Wales, as well as the Pennine range and the rest of the north of England as far as Derby, were covered with thick ice, which in most parts reached down to the sea, and that extensive snow-beds prevailed over the rest of England. In the summer months the melting of these would give rise to streams of muddy water, and produce the superficial deposits of Brick-earth, Warp, and Loess; whilst, when the currents were stronger, perhaps from the thaw being unusually rapid, deposits of gravel would be formed. This second ice-sheet would gradually become less and break up into valley-glaciers, which in their retreat would leave kaims and eskers at low levels, and moraines in the mountain glens. During this time no new great submergence of the country took place; and the last great modifications of the surface were subaërial, and not submarine, the work having been done by frost, rain, and glaciers. In the discussion which followed, Mr. Jeffreys considered that the author's remarks relating to the beds containing Arctic species of mollusca were not quite correct. *Pecten islandicus* has been found in the drift of Scotland, but not in the seas at present surrounding that country. At depths of 30 or 40 fathoms many arctic shells in a semifossil state have been dredged, although they do not now live in those waters. *Mya truncata*, a species which lives in very shallow water, has been found in much deeper water in a semi-fossil state. At Fort William there is a bed containing arctic species of shells 7 or 8 feet above the level of the sea. Arctic shells of deep-water species have occurred 200 feet above the sea. Different conditions have existed at different parts of the same seas, altering the character of the mollusca. The raising of the sea-beds above the level proper to enable certain mollusca to flourish, would cause them to become extinct. Dr. Carpenter mentioned that cold water may be thrown up into very small depths under certain circumstances. Near Halifax, N.S., the surface-water is tolerably warm, but at no great depth the temperature falls to 35° F. In this case the rotation of the earth causes the cold water from the north to surge up on its western coast. The North Sea is a shallow sea, with a shoal in the middle, and having off the coast of Norway a deep channel which conveys the cold arctic undercurrent; hence the east side is 10° F. colder than the west side. Local peculiarities of disturbance of temperature may thus occur within short distances. Prof. Ramsay remarked that the author was not dealing with wide ocean deposits, but with ice coming down to the sea from the land. He had described certain changes,—a great glacial period, a period of submergence, and a second minor glacial period. Mr. Prestwich maintained that temperature was a most important question in connection with the subject of Mr. Jamieson's paper. The glacial deposits were not formed in deep sea, but in shallow water with shore temperatures. He thought that the paper was very speculative, and remarked that the evidence upon which the opinions expressed were founded was not always given.

GEOLOGY OF CLEVEDON.—In answer to your correspondent "K. L. G." in the May number of SCIENCE-GOSSIP, I beg to state that all the "Red rocks" of Clevedon, and of the Mendip Hills and the Bristol district, belong to the Keuper, or Upper Triassic series. These rocks include the Dolomitic or Magnesian Conglomerate, Red Marl, Sandstone, and occasionally Magnesian Limestone. There are no rocks of Permian age in Somersetshire, and the introduction of this name into the county, which has been given in several local pamphlets and guide-books, is due to a misunderstanding of the term Magnesian, as applied to the Dolomitic Conglomerate: it is merely indicative of the matrix or cementing material, and is not used as a mark of age, as with the Magnesian Limestone (Permian) of the northern and midland counties of England. The relation between the various divisions of the Red rocks themselves is not altogether one of lithological succession, such as is often given in text-books; namely (in descending order), 1. Marl, 2. Sandstone, 3. Conglomerate. Each of these divisions, as well as the Magnesian Limestones which are seen at Clevedon, also near Bristol and in Glamorganshire, may and do occur anywhere in the Keuper series. The whole history of the Triassic rocks from the oldest beds in South Devon (and some of them are very likely older than the Keuper) shows that Marl, Sandstone, and Conglomerate, or Breccia, were deposited at all

horizons, one replacing another in horizontal extension, although at the same time it must be observed that there is a certain tolerably regular and similar succession in the order in which the beds have been locally deposited. This, however, is only what might be expected, the different depths of water and shore conditions being indicated by the sediment deposited. The relations between the Red rocks in East Somerset with the beds above is clearly shown in many sections, the red marls being overlain conformably by the Rhætic beds. In places too, the Dolomitic Conglomerate, which is only the beach deposit of the marls, occurring at all horizons at its margin, is overlain directly by the Rhætic beds. The Red rocks in this district may therefore be satisfactorily assigned to the Keuper division of the Trias. Further south, in West Somerset and Devon, the area may have received deposits during the earlier portion of the Triassic period. Some of the beds have indeed been coloured as Bunter, in the geological maps of Greenough and Ramsay, but as Pengelly and Whitaker have pointed out (and last summer, in company with my colleague W. A. E. Usher, I came to the same conclusion), there is no real break or unconformity between the Rhætic beds of Axmouth and the Sandstones and Breccias of Dawlish and Teignmouth. The whole of these beds might be termed Keuper, but, owing to their great thickness, there is some justification in thinking that the Muschelkalk might be represented, as well as the Bunter, and by sediments of a different lithological character. It is best, therefore, to term the whole development the Triassic series, without making any subdivisions (which would have no value) to correlate them with the divisions made on the Continent. Those who inquire into the literature of the subject will see what little reason there is to see any unconformity whatever in the Triassic series throughout England; but this is a subject too large to be dealt with here.—*Horace B. Woodward, Geological Survey of England and Wales.*

NOTES AND QUERIES.

Snakes and Toads.—*Apropos* of a query in a last year's paper—Do snakes eat toads as well as frogs?—I can relate a case in point. I was stooping over a bed of strawberries intent on fruit, when there emerged above the thick foliage, right under my nose, an enormous head and neck of such strange form that I could not make out what manner of creature it might be. Of course I changed my position rather suddenly; but noticing that the head seemed to belong to one of the snake tribe, I seized a stick and struck it a sharp blow, as it still stood with neck reared above the leaves. To my utter astonishment out flew a medium-sized toad, knocked out of the snake's jaws by the force of the blow! When I came upon the scene, nothing was visible of the poor little victim except his hind feet; all the rest was lodged in the snake's gullet. When I came to examine the toad I had so unexpectedly rescued, I found him alive, but at his last gasp; whether from the effect of my blow, or treatment received of the snake, I can't say. The snake was of the species known here as the "Garter," and was scarcely as large as my thumb. Moral: Snakes *do* eat toads as well as frogs.—*A. F. Dod, Memphis, U.S.A.*

Geology of Barnet.—I propose spending my three weeks' holiday this summer at Barnet, and shall be much obliged for any information concerning the geological characteristics of the neighbourhood, and hints which may be of use in my excursions in search of fossils, rock specimens, &c. Is there any book published relating specially to this part of England?—*K. Brierly.*

Molluscan Threads (p. 49).—I am much obliged to Mr. William Harte, F.R.G.S.I., for his courteous communication (p. 117). My experience of the thread-spinning of the slugs is less than of the spinning of fluviatile mollusks, and I spoke too decisively when I said that slugs "do not use it [the thread] as a means of ascent." I ought rather to have said, I have never seen them so use it. Mr. Harte will give me credit for having modified my assertion a little by saying (p. 52) "my observation teaches me," &c. I have not seen Mr. Harte's paper upon the use of the thread, by *Limax arborum*, or I should certainly have availed myself of his very interesting observations; but I am glad he has corrected my error and added to my little store of knowledge upon a subject, the study of which has afforded me much pleasure.—*G. Sherriff Tye, Handsworth.*

Preserving Fungi.—Being desirous of making a collection of "British Fungi," would any reader of the Science-Gossip inform me how to preserve the fungi from shrivelling, rotting, and losing colour?—*L. R.*

Rare Insects and Bad Seasons.—A contributor to Science-Gossip has, in the January number, alluded to the circumstance, that, especially in the order Lepidoptera, in such a year as 1873, when both butterflies and moths were scarce, examples generally turn up of species of particular rarity. Several conjectural explanations have been given of this; and it may, of course, be the fact, that the atmospheric phenomena which are unfavourable to many common species, may be suitable and favourable to others we less often see. But perhaps the explanation lies simply in this, that in a year when there are fewer insects about than usual, we notice more carefully what is abroad, and specimens, which in an average season may be often missed in the multitude of others, come out more prominently when the entomologist is putting very little into his boxes.—*J. R. S. C.*

Unknown Plants.—Will any reader of Science-Gossip kindly inform me of the names of the undermentioned plants; viz.—1. An Orchis, bearing a spike of flowers about ten or twelve inches long, the whole flower green, the lips slightly paler, and divided like a clergyman's band; root cylindrical and fibrous? 2. An Orchis, apparently leafless, the spike of flowers about four inches long, flowers brown and uninteresting, appearing as if scorched by hot sun; found in this neighbourhood, on dry sunny banks? 3. A plant resembling an Orchis in growth, and found in same localities, but bearing a head of flowers upon a stalk about three or four inches high,

the flowers about twelve in number, each composed of six white petals, every three lobed, the lower part of the stem bulbous, like a spring onion, but solid instead of being composed of layers; root cylindrical and fibrous, like an orchis. The whole plant smells and tastes very strongly of garlic?—*K. F. L.*

White Beech-leaves. — A friend of mine, whilst taking a walk the other day, was struck with the appearance of a beech-tree, a branch of which had its leaves perfectly white. Thinking that the leaves had withered, he examined them, and found them quite fresh. Never having heard or seen the leaves of a beech of this colour, I thought it worth making a note of. I inclose you a small bit, although I am sorry to say it is not so fresh as when I first saw it. The remainder of the tree was of the normal colour.—*James Bate.*

Jelly on Sea-weeds.—I should be obliged to any of your readers who would tell me the name and nature of the masses of green jelly found attached to various sea-weeds. They are about the size of a pea, and are seen by a lens to be studded throughout with a multitude of minute green globules. The gelatinous substance is nearly structureless under the microscope, merely showing faint signs of striation, and the globules seem to be granulated more densely towards the centre. Their diameter is about the two-hundredth of an inch.—*George Guyon.*

Slugs *v.* Alpine Plants.—I am happy to be able to recommend to "Mary Longhear" a certain way of protecting her alpine plants from slugs. I had been annoyed by these for a long time, and could find no certain remedy. At length I determined to "fortify" the bed, and admit none but such as could "leap the ditch." This fortification I effected to my entire satisfaction by procuring a coil of zinc, which I cut into strips about 20 inches wide, and bent into U form, and buried as an edging round the bed, and kept it constantly *nearly* filled with water; and I found that neither slug nor snail ever crossed it, and it was very easy to banish all that happened to be inclosed. I connected this with a fishpond, and it no doubt afforded the inhabitants a source of great pleasure, as they regularly made "excursions round the world," and seemed to benefit much by the liberty given them. In small pots standing in the water I planted several pretty plants, such as *Drosera*, *Pinguicula*, mosses, &c. &c., taking care that no bridges were formed: the effect was very pleasing. I give my address, and shall be glad to exchange further ideas with "Mary Longhear." — *T. MacGann, Burrin, Ireland.*

P.S.—At several potteries they are now manufacturing pots and pans with double sides to hold water between them for the same purpose and to keep up a constant supply of moisture.

Birds and Primroses. — Being very fond of primroses, I have quantities of them growing on the sides of the drive leading to my house, the trees overshadowing which are sacred to blackbirds, thrushes, and birds of all kinds. Each spring I observe that my floral pets are destroyed by hundreds, the flowers being bitten off at their junction with the scape, and usually the germ appears to have been abstracted. Without doubt the blackbirds are the depredators; but why they should do it, and what for, it seems difficult to determine. My own notion is that the Blackbird really eats the germ, as it has a somewhat sub-acid flavour, and in early spring it seems to be the only kind of fruit he can get at. Later in the year he pays too much attention to our strawberry-bed; still we put up with these depredations on account of his fine, vigorous music.—*Jas. Buckman, Bradford Abbas.*

Parrots.—With regard to Mr. Guyon's inquiry about my anecdote of the parrot, I beg to state that the "action was *so* carefully observed as to leave no loophole for doubt that it was designed." Numerous instances of the sagacity of the Parrot tribe might be given, some of which undoubtedly manifest, at least to my mind, the existence of mental faculties, quite apart from those natural instincts with which they are endowed for supplying the more ordinary demands of their being.—*G. O. Howell.*

Moths' Wings.—In answer to the query of your correspondent "S. A. B." viz., "Do moths fold their wings over their backs as butterflies?" I would remark that all lepidoptera act thus when drying their wings immediately after emergence from the pupa. But when the wings once become thoroughly hardened, this peculiarity is possessed by the butterfly alone, the moth then placing its wings on or around its body. Doubtless your correspondent observed in his captive its excellent condition, another but not so certain an indication that it had just assumed the imago state. It is not unfrequently given as a rule of distinction betwixt butterfly and moth, that the one when at rest places its wings erect over the back, whereas the other wraps them round the body; however, this does not hold good till our friend has made at least one journey through the air.—*Henry A. Auld.*

Destruction of Insects.—I thoroughly agree with your correspondents that something ought to be done to stop the wholesale destruction of insects, &c., that takes place year after year. But what? Some time ago a collector showed me some boxes in which were literally dozens of butterflies, all jumbled together so that they were of no use whatever. His usual plan of collecting was, as soon as he saw an insect to net it, and before looking to see if it was anything he wanted, kill it first and examine it afterwards; so that I should think by the end of a season he must have killed hundreds, and after selecting what he wanted, have thrown the rest away. It is true they were mostly the common sorts, but we know that many butterflies, which are now rare with us, were originally amongst the common ones; as, *C. dispar*, *P. Acis*, and *P. Arion*. Again, in the season of 1872, a swarm of *A. Lathonia* occurred here, and of course there was a rush of collectors after them (I confess I was one). I recollect one day counting fourteen or sixteen nets in one meadow; the consequence was, that last year I did not hear of a single specimen being taken, and the year before I myself knew of over thirty; but most likely there were other captures which did not come under my observation. It was the same with *P. Daplidice* and *V. Antiopa*, several of which were taken here the same year. Now if these insects had been left alone, they would, in all probability, have bred here (for there were both sexes), and so have become regular inhabitants, instead of occasional visitors. The most thorough means of preserving the insects of this land (but not the most probable) would be for all true entomologists to cease from collecting for a few years, say the next six, in order to give those insects which

only visit our shores now and then, the chance of settling here, and those which are inhabitants here, but at the same time rare, the opportunity of becoming more abundant; but I am afraid it would be too great an appeal to the self-denial of collectors. Although I catch numbers of insects every year, I don't kill one half of them, for I can generally determine what they are while in the net, and unless they are the sort required, I let them loose. I try to get six of each species in my collection, three of each sex, where there is any difference in the markings, and generally have two or three surplus ones in case of accidents, or for exchange. Perhaps some other of your readers can devise some means for preserving the favourite little insect "the Brisish butterfly." —*J. A. Allchin, Dover.*

Curious Places for Robins' Nests.—Several instances have been recorded this spring of robins building their nests in remarkable places. The following notes from the West of England may prove interesting. At a cottage near Charlton Park, occupied by a shepherd to the Earl of Suffolk, a pair of robins took possession of a hat which was suspended on a ram's horn, fixed in the cottage for such purposes. Here the eggs were laid, and young ones hatched and cared for. Near Dauntsey station, at the house of Mr. Potter, an unused tea-kettle was taken posession of by another pair of robins. These birds also brought up their young ones, and are so tame as to allow Miss Potter to handle and show them. A third pair chose part of the harness left in the stable of Mr. Thomas Hussey, the Manor, Ilchester. The carter found Mrs. Robin determined not to be frightened away, and would allow him to carry her and her home about the stable. The master subsequently gave orders not to have the birds disturbed, and the latest bulletin reported mother and family doing well.—*W. Macmillan, Castle Cary.*

Scirpus lacustris &c. (p. 141).—It is not improbable that *Scirpus maritimus* was the plant observed by "T. W." about Hammersmith and Putney. It still lingers in very small quantities on the Middlesex shore, where it was seen last year near Fulham (*Journal of Botany*, xi. 342), and is found in greater abundance on the Surrey side. I gathered it myself at Putney a few years back, in company with *S. carinatus*, and have also noticed it by a small pond in the grounds at Putney Hill, at a considerable distance from the river. "T. W.'s" other plant would appear to be *S. carinatus*, which occurs in that neighbourhood in considerable plenty on both banks of the Thames. It is generally reckoned to be rather an unsatisfactory species, and is arranged by Hooker, in the "Student's Flora," as a subspecies under *S. lacustris*. *S. triqueter* ("stems acutely triquetrous throughout,"—Babington's Manual) seems distinct enough, and was a Linnean species.—*R. A. Pryor.*

The Tortoise.—Having expressed a wish for some time to possess a tortoise, a relation at the time residing at London procured me one at Covent Garden, May 1st, 1872, and on Thursday, May 2nd, 1872, it arrived, packed in a tin case, something resembling a painter's pot, only with a corner perforated with holes. One reason why I wished for a tortoise was to rid the kitchen of blackbeetles, and the garden of slugs, &c., which it most effectually did. Some time after the tortoise had been with me, I discovered one morning a small egg, perfectly white and rather rough. I was at a loss for a short time to make out from what source the egg came, but I at last had it suggested that it was the tortoise's egg. Many ridiculed the idea. I scarcely thought it could be the tortoise that had been exposed for sale at Covent Garden, and also for some time with me, that had laid it. A short time after the first, a second egg was laid, which I broke, and had a great deal of trouble to do so, it (*i. e.* the shell) was so hard. The inside, as far as I can remember, looked much the same as a very small hen's egg. I gave the first to a friend, who I believe still has it. I now became almost convinced that the tortoise must have laid it. Some time after it was found dead. Of what it died I was, and am now, to a certain extent at a loss to comprehend. I buried it in the garden about the 14th April, 1873, and to-day (the 2nd of April, 1874) I dug it up, in order to see if I could not keep the scales, which are very easily removed from the carapace when the tortoise has been dead for some time. Having dug it up and removed the said scales, I found it had been greatly damaged by rain, &c., so that I determined once more to consign it to mother earth; but putting a brick, or rather letting it fall on the remaining carapace, I broke it up, *i. e.* the carapace. I at once removed it from the earth, and examined the decayed matter in the inside, when to my great surprise I found an egg which, after it had been removed and washed, I found to be exactly like the other two before-mentioned. Now the question arises, Is it usual or a common occurrence for tortoises, away from their natural habitat, to deposit their eggs? I am not certain whether my tortoise was *Testudo Græca* or *Chersina marginata*, though from what E. Halse says in his paper on "The Tortoise and its Skeleton" (Science-Gossip, 1873, p. 129), I should think it was the latter. Perhaps he would throw some light on the egg subject. Of course, there is now no doubt that it was the tortoise that laid the eggs, as I have now found the last in the decaying body of the animal. I shall forward it to the Editor with these notes.—*Charles F. W. T. Williams, C.E., Redland, Bristol.*

Half-aquatic Aphides.—I have observed with much interest the proceedings of some of these insects in the aqua-vivarium, resident on the floating leaves of the Water Crowfoot, where they enjoy a happy immunity from those insatiable enemies which delight to gorge themselves with aphis flesh, nor are they the petted slaves of their self-interested visitants, the ants. A couple of females founded the colony, and two or three generations soon followed. In one or two instances they must have passed from one leaf of the plant to another across the surface of the water, but I could not ascertain how this was managed. A "wet jacket" the little creatures do not appear to mind in the least, being often on the edges of the leaves close to the water; still, when totally submerged, they soon perish. The act of parturition is, seemingly, usually preceded or followed by a casting of the skin.

Mould in Fern-cases.—I think if "F. J. S." would daily wipe the inside of his fern-glasses "dry and bright," he would not be much troubled with mould. I have found this suggestion, for which I am indebted to Shirley Hibberd's "Fern Garden," very beneficial. Should mould still appear, "F. J. S." must arrange for greater ventilation.—*W. R. H.*

Ebonite Cells.—Would any reader who is in the habit of using these tell me the best way of affixing them to the glass slips?—*W. R. H.*

NOTICES TO CORRESPONDENTS.

H. J. McG.—Your plants are,—No. 1, *Erodium cicutarium*; No. 2, *Spergula arvensis*.

O. Bates.—The shrub from near Abergele is *Garrya elliptica*.—*J. F. R.*

A. C.—Your plant, called the "Snowdrop-tree," is doubtless *Symphoria racemosa*, or "St. Peter's wort," a native of North America. A good elementary book on Botany is that of Professor Oliver, or Masters's "Botany for Beginners."—*J. F. R.*

J. Platt.—Your fossils obtained from the gravel-pit were not vegetable, but animal. Both are fossil corals, of carboniferous age, both of them *Lithostrotion*.

J. L.—Get Wood's "Insects at Home." It not only contains figures of the various insects you name, but gives popular and trustworthy accounts of them.

G. W. B.—The diatomaceous deposit described by Ehrenberg as *Bermuda tripoli* was long supposed to have come from the Bermuda Islands. Mr. G. Norman, of Hull, found that it came from New Nottingham, U. S., near which is a township or hundred called Bermuda. Professor Bailey seems to have sent Ehrenberg a sample, labelled *Bermuda tripoli*. It was probably sold as a polishing powder under that name, just as one of the Irish subpeat deposits was locally known as "Lord Roden's Plate-powder." I fear the New Nottingham deposit cannot be purchased here, but I have no doubt that some American microscopist would be able to supply a small quantity of it.—*F. K.*

Fossil Teeth.—Fig. 57, in last number of Science-Gossip, was printed upside down. We simply mention this that the mistake may not mislead any student.

W. K. G.—You will find a good deal of information respecting the Old Red Sandstone fossils of Scotland in Ray Lankester's monograph on Devonian Fishes, published by the Palæontographical Society; in Hugh Miller's "Old Red Sandstone," "Footprints of the Creator," &c.; and figures of fossils in Devonian strata elsewhere, in Murchison's "Siluria," Geikie and Jukes's "Geology," Taylor's "Geological Stories," &c.

T. E. Mason.—Your letter has been forwarded. You would find no difficulty in procuring diatomaceous material through our Exchange column, if you have anything to offer for it.

H. W. Kruse, of 2, Portland-place, Southtown, Great Yarmouth, kindly offers to assist any of the Science-Gossip marine aquarium-keepers in obtaining salt water, if the latter are willing to pay the cost of transmission.

H. T. G.—Your plant is *Veronica Buxbaumii*.

H. O.—Whitaker's "Geology of the London Basin," which forms one of the volumes published by Government, under the direction of the Geological Survey, will give you all the information you seek relative to the depths of the deeper wells in and about London, and the strata through which they are sunk.

P. S. E.—You will find the differences (which are very great) between the *Hydrozoa* and the *Polyzoa* in any good manual of zoology.

J. Lumsden.—Your mosses are,—3, *Dicranella cerviculata*; 4, *Hypnum purum*; 5, *Sphagnum cuspidatum*. No. 2, the supposed "Coralline," is a seaweed, called *Corallina officinalis*.

E. W.—Your mosses are,—1, *Funaria hygrometrica*; 2, *Dicranella varia*.—*R. B.*

E. V. Pike.—Kirby & Spence's "Entomology" is published by Longmans & Co., at about 5s. For a beginner, Newman's "British Moths" and "British Butterflies," would be much better. The price is not very great.

J. Dutton.—Stark's "History of British Mosses," published by Lovell Reeve & Co., would be the best book you could obtain. The price is, we believe, 10s. 6d.

E. Thomas.—It is not at all a rare matter for the Peacock butterfly to be seen on fine days in February, inasmuch as it hybernates during the winter, and is warmed into life by the returning heat of the sun.

S. A. Brenan.—*Phallus esculentus* is identical with *Morchella esculenta*. See Cooke's "Handbook of British Fungi," fig. 656.

J. C. Muir.—We are sorry to say your specimens of *Isoetes hystrix* never reached us.

R. Taylor, referring to Tate's "Manual of British Molluscs," which gives the habitat of *Planorbis lineatus* as "near London," wants to know the exact locality. Will some one help him to it?

Henry Gould.—Your specimen is not a clustercup, but so nearly resembles *Æcidium* that it was formerly called *Uredo æcidiformis*. It is now known as *Trichobasis petroselini*. The plant on which you have found it is the *Smyrnium olusatrum*.—*M. C. C.*

J. G.—You will find a good direction of how to cut sections of coal in page 87 of Science-Gossip, volume for 1872, and a further account, by Mr. E. T. Newton, on page 19, volume for 1873.

C. C. Underwood.—Your micro-fungus on leaf of Da[illegible] palm is *Graphiola phœnicis*, figured in Cooke's "Handbo[illegible] of British Fungi," fig. 221.

E. L.—The snail shell is that of the "Apple snail" (*Hel[illegible] pomatia*), our largest species. The mineral is carbonate [illegible] lime (*calcite*), deposited as stalactite.

EXCHANGES.

Pterocera Bentleyi, &c., for other fossils.—H. Gould, 6, Ironmonger-street, Stamford.

Reindeer Moss from Labrador, and Liber of White Birch, Dagger-plant, and Lace-bark tree, for Shells, for a little girl's collection.—Mrs. Reid, Bridport, Dorset.

Collema biatorinum, *Sticta aurata*, *Fauraria nebulosa*, &c., offered for other Lichens.—Send list to R. V. T., Tregawn, Withiel, Bodmin.

Wanted, a Geologist's Pickhammer. State what required.—W. G., 3, Gordon-street, Nairn, N.B.

Wanted, a few Larvæ of Crane-fly (*Tipula*), and ditto Cockchafer (*Melolontha vulgaris*). A good return will be made in Microscopic Objects, mounted or unmounted.—Address to Jas. Lumsden, 197, Dorning-street, Wigan.

American Sea-weeds for British or Australian ditto.—Address, F. W. Hall, 14, Park-street, New Haven, Ct., United States.

Puccinia busi.—Send stamped envelopes and objects of interest to C. P., Innox Cottage, Corscombe, Dorchester.

Melitæa Cinxia, *Arge Galathea*, *Lycæna Adonis*, and others, for Lepidoptera, British Plants, or Birds' Eggs.—Send list to W. Jordan, Cockfield, Sudbury, Suffolk.

Twenty-nine Monthly parts of "Cassell's Book of Birds," for the "Illustrated Natural History of British Butterflies," by Newman, or anything useful to an entomologist.—H. Sims, Howard-street, Wakefield.

I should be glad to exchange Flowering Plants, Ferns, Mosses, Lichens, &c., during the coming summer, with any of the readers of Science-Gossip.—F. W. Hall, 14, Park-street, New Haven, Ct., United States.

Send stamped envelope and object for Sections of Horn, Hoof, and Cuttlebone, to Thomas Lisle, Moorfields, Wolverhampton.

Well-mounted Foraminifera from Pacific, 1,400 fathoms, for good Diatom or other Slides and material.—H. B. Thomas, Boston, Lincolnshire.

Eggs of Blackheaded Bunting, Barn Owl, Sand Martin, Sedge Warbler, Whinchat, and others, in exchange for other British Eggs.—Address, John Platt, Shavington, Nantwich, Cheshire.

Shells Wanted: *Valvata cristata*, *Planorbis carinatus*, *P. lacustris*, *Zonites nitidus*, and *Anodon cygneus*, varieties. Offered: *Unio margaritifera* (English), *Claustilia dubia*, *C. nigricans*, *Helix sericea*, *Pupa pygmæa*, and *Succinea putris*, var. *intermedia*.—W. F. Sutton, Gosforth Grove, near Newcastle-upon-Tyne.

Microscopic Slides in exchange for others.—Send lists to John C. Hutcheson, 8, Lansdowne-crescent, Glasgow.

BOOKS RECEIVED.

"The Ice Age." By James Geikie, F.G.S. London: Ibister & Co.

"British Hepaticæ." By Dr. Carrington. Part I. London: Hardwicke.

Timbs's "Year Book of Facts for 1874."

"Smithsonian Report" for 1872.

"Grevillea." April.

"Land and Water." April.

"Journal of Applied Science." April.

"Canadian Entomologist." March.

"Popular Science Review." April.

"Monthly Microscopical Journal." April.

"Boston Journal of Chemistry." April.

"Transactions of the Manchester Geological Society."

Communications Received up to the 12th ult. from:—Dr. C. C. B.—C. B.—J. E. W.—W. H. W.—E. V. P.—J. T. S.—A. S. J. A. D.—M. L. W.—F. S.—E. A. B.—H. E. W.—J. L.—E. F. S.—L. S.—G. W. B.—J. B.—W. W. S.—G. A. D.—S. A. B.—G. G.—H. M. M.—W. E. H.—O. A.—E. T.—C. W.—E. H. V.—A. C.—J. B.—T. McG.—W. G.—S. I.—W. H. G.—T. B. W.—H. T. G.—B. T. L.—L. R.—J. G. B.—C. L.—F. M. P.—T. E. M.—H. J. McG.—W. J. C.—E. H.—R. V. T.—H. W. K.—W. K. G.—W. R. H.—J. L.—H. G.—C. F. W. T. W.—E. J.—E. P. P.—J. S. R.—B. G. L.—E. L. R.—M. J. U.—F. J. A.—H. B. T.—J. C. H.—H. M. W.—J. P.—L. G.—W. F. S.—J. F. R.—W. B. F.—T. L.—W. J. S. S.—C. M. M.—S. J. Mc. I.—E. T. N.—W. P.—E. D. M.—A. T., &c.

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